

WITHDRAWN

NEW YORK ACADEMY OF SCIENCES

SCIENTIFIC SURVEY

OF

Porto Rico and the Virgin Islands

VOLUME VI—Part 1

Botany of Porto Rico and the Virgin Islands

Descriptive Flora—Spermatophyta (Continued)

N. L. Britton and Percy Wilson



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Order 24. MYRTALES.

Herbs, shrubs or trees, unarmed, sometimes aquatic or amphibious. Leaves alternate or opposite. Flowers regular, or irregular, complete, and often showy. Calyx-tube merely enclosing the ovary or adnate to it. Stamens few or many. Anthers opening by slits, valves or pores. Stigma terminating the style, or sessile. Fruit capsular, drupaceous or baccate, or resembling an achene.

Anthers opening by pores.	Fam. 1. MELASTOMACEAE E.
Anthers opening by longitudinal valves.	
Calyx-tube merely enclosing the ovary.	Fam. 2. LYTHRACEAE.
Calyx-tube adnate to the ovary or mainly so.	
Cotyledons spirally convolute in the embryo.	Fam. 3. PUNICACEAE.
Ovary several-celled; ovules many.	Fam. 4. TERMINALIACEAE.
Ovary 1-celled; ovules 2-5.	
Cotyledons not spirally convolute.	
Sepals imbricated, or united and the calyx falling away as a cap.	Fam. 5. MYRTACEAE.
Sepals valvate.	
Leaves stipulate; sepals leathery.	Fam. 6. RHIZOPHORACEAE.
Leaves not stipulate; sepals membranous or herbaceous.	Fam. 7. ONAGRACEAE.

Family 1. MELASTOMACEAE R. Br.

MEADOW-BEAUTY FAMILY.

Herbs, or many shrubs or trees in tropical regions, with opposite 3-9-nerved leaves (pinnately veined or nearly veinless in *Mouriri*), and regular perfect often showy but rarely odorous flowers. Stipules none. Calyx-tube usually 4-5-lobed, the lobes imbricated. Petals as many as the lobes of the calyx and inserted on its throat, imbricated. Stamens twice as many, or equal in number to the petals, often inclined or declined, the alternate ones sometimes shorter. Ovary 2-several-celled (often 4-celled); style terminal, simple; ovules many, anatropous. Fruit included in the calyx-tube, capsular or baccate. Seeds mainly small, with no endosperm. About 150 genera and 2500 species, widely distributed in tropical regions, most abundant in South America. Many or most of the shrubs of this family are known in Porto Rico as CAMASEY.

A. Fruit many-seeded; seeds minute; leaves 3-9-nerved.	
1. Fruit capsular.	
Base of the connective prolonged.	
Petals obtuse.	1. <i>Acisanthera</i> .
Petals acute.	2. <i>Nepsera</i> .
Base of the connective not prolonged.	3. <i>Rhexia</i> .
2. Fruit baccate.	
a. Inflorescence terminal, rarely also axillary.	
Panicle-branches flattened, 3-flowered at ends.	4. <i>Menendezia</i> .
Panicle-branches not flattened.	
Exterior calyx-lobes inconspicuous or none.	
Calyx constricted above the ovary.	5. <i>Tetrazygia</i> .
Calyx not constricted above the ovary.	
Calyx oblong; anthers linear-subulate.	6. <i>Tamonea</i> .
Calyx hemispheric to campanulate.	7. <i>Miconia</i> .
Exterior calyx-lobes longer than the interior.	
Ovary 3-4-celled; leaves coriaceous.	8. <i>Calycogonium</i> .
Ovary 6-12-celled; leaves membranous.	9. <i>Heteroirichum</i> .

- b. Inflorescence axillary or lateral.
 Petals obtuse.
 Base of the connective prolonged. 10. *Mecranium*.
 Base of the connective not prolonged. 11. *Clidemia*.
 Petals acute or acuminate.
 Flowers borne below the leaves. 12. *Henrietta*.
 Flowers axillary. 13. *Ossaea*.
 B. Fruit only 1-4-seeded; leaves pinnately veined. 14. *Mouriri*.

1. **ACISANTHERA** P. Br.; Adans. Fam. Pl. 2: 85. 1763.

Herbs or low shrubs, with small, short-petioled or sessile leaves, and small, axillary or terminal, solitary or paniced flowers. Flowers 4-parted or 5-parted. Calyx-tube subhemispheric or campanulate, its lobes acute or acuminate. Petals obovate or suborbicular, obtuse. Stamens 8 or 10, the smaller alternate ones often imperfect; filaments glabrous; anthers various, the connective produced below the sacs, 2-lobed or 2-spurred. Style filiform or subclavate; stigma very small. Capsule 2-4-valved, many-seeded; seeds minute, foveolate. [Greek, pointed anthers.] About 20 species, of tropical America, the following typical.

1. **Acisanthera Acisanthera** (L.) Britton.

Rhexia Acisanthera L. Syst. ed. 10, 998. 1759.

Acisanthera quadrata Juss.; Poir. in Lam. Encycl. Suppl. 1: 111. 1810.

Uranthera dicranophora Naud. Ann. Sci. Nat. III. 12: 283. 1849.

Melastoma uniflora Sessé & Moc. Fl. Mex. ed. 2. 105. 1894.

Subherbaceous, perennial, usually much branched, 3 dm. high or less, the branches sharply 4-angled, glabrous or glandular-pubescent, slender. Leaves ovate or ovate-lanceolate, membranous, serrulate, 1.5 cm. long or less, short-petioled, the apex acute, the base narrowed or obtuse; flowers solitary in the axils, short-peduncled; calyx-tube about 3 mm. long, its lobes about as long; petals rose or purple, about 6 mm. long; capsule globose, about 4 mm. in diameter.

In wet sandy soil at lower and middle elevations, Porto Rico, especially on the northern coastal plain:—Jamaica; Cuba; Hispaniola; Central and South America.

2. **NEPSERA** Naud. Ann. Sci. Nat. III. 13: 28. 1849.

A low slender, loosely pilose or glabrate, branching shrub with thin ovate petioled leaves and small, white or pink, paniced 4-parted flowers. Calyx-tube ovoid, its lobes narrowly lanceolate, persistent. Petals oblong-lanceolate, acute. Stamens 8, the alternate ones unequal; filaments glabrous; anthers subulate, 1-porose, the connective produced below the sacs into 2 spurs. Ovary globose, 3-celled; style filiform; stigma very small. Capsule 3-valved, many-seeded. Seeds minute, foveolate. [Bad anagram of *Spennera*.] A monotypic genus.

1. **Nepsera aquatica** (Aubl.) Naud. Ann. Sci. Nat. III. 13: 28. 1849.

Melastoma aquatica Aubl. Pl. Guian. 1: 430. 1775.

Spennera aquatica Mart.; DC. Prodr. 3: 116. 1828.

Homonoma aridum Bello, Anal. Soc. Esp. Hist. Nat. 10: 269. 1881.

Stem 0.5-1.5 m. high, the larger plants much branched. Leaves membranous, 2-7 cm. long, serrulate, 5-7-nerved, the apex acute or acuminate, the base rounded or subcordate, the slender petioles 0.5-2 cm. long; panicles loosely pyramidal with filiform branches and pedicels; calyx-tube 2-3 mm. long, about as long as the lobes; petals 5-6 mm. long; capsule globose, 2 mm. in diameter.

Woodlands, thickets and grassy banks in wet or moist districts, Porto Rico, ascending into the eastern mountains; recorded from St. Thomas, probably erroneously:—Jamaica; recorded from Cuba; Hispaniola; Guadeloupe and Dominica to Trinidad; northern South America. ALTEA.

3. **RHEXIA** L. Sp. Pl. 346. 1753.

Perennial herbs, often somewhat woody at the base, sometimes tuber-bearing, with mostly sessile opposite 3–5-nerved leaves, and terminal showy cymose or rarely solitary flowers. Calyx-tube urn-shaped or campanulate, constricted at the neck, its limb 4-lobed, the lobes shorter than the tube. Petals 4, obovate, oblique. Stamens 8, equal; anthers incurved or inverted in the bud. Ovary free from the calyx, glabrous, 4-celled; style slender; stigma truncate. Capsule 4-celled, 4-valved. Placentae 4-central. Seeds numerous, coiled or bent, rough. [Greek, breaking, applied originally to a different plant.] Thirteen known species, of eastern North America and the West Indies. Type species: *Rhexia virginica* L.

1. **Rhexia cubensis** Griseb. Cat. Pl. Cub. 104. 1866.

Stems slender, branched, loosely glandular-pilose, erect or ascending, 5 dm. high or less. Leaves linear, sessile, remotely denticulate, 1–2.5 cm. long, 1–3 mm. wide, 1-nerved; flowers few in terminal cymes or solitary; bracts small; calyx glandular-pilose or glabrate, 6–8 mm. long, its lobes lanceolate, acuminate, about 2 mm. long; petals pink or purple, 12–16 mm. long; anthers linear, spurred at the base; capsule about 7 mm. long, its neck about as long. [*R. linearifolia* Hamilt.?; *R. Mariana* of Stahl, of Cogniaux and of Urban, in part; *Melastoma linearis* of Sessé & Mocino, not of Reinw.]

Wet sandy ground on the northern coastal plain of Porto Rico:—Florida; Cuba. WEST INDIAN MEADOW-BEAUTY.

4. **MENENDEZIA** Britton, gen. nov.

Trees, with chartaceous, 3–5-nerved entire petioled leaves, and rather large white 4-parted flowers in terminal panicles, sessile in 2's or 3's on the flattened spreading panicle-branches. Calyx-tube 4-angled, scaly, constricted above the ovary, the lobes ovate or subulate. Petals obovate. Stamens 8; filaments slender; anthers linear, 1-porose. Style filiform. [In honor of Rafael Menendez Ramos, Director of the Insular Agricultural Experiment Station of Porto Rico.] Three known species of Porto Rico mountain forests. Type species: *Tetrazygia Stahlia* Cogn. The fruit is not known.

Leaves green above, canescent beneath.

Outer calyx-lobes linear-subulate.

Calyx-lobes narrowly ovate.

Leaves nearly equally green on both sides.

1. *M. Stahlia*.

2. *M. Urbanii*.

3. *M. biflora*.

1. **Menendezia Stahlia** (Cogn.) Britton.

Tetrazygia Stahlia Cogn. Jahrb. Bot. Gart. Berlin 4: 279. 1886.

A tree, up to about 20 m. high, the young twigs, inflorescence, petioles and under leaf-surfaces densely canescent. Leaves lanceolate to ovate-lanceolate, chartaceous, 5–10 cm. long, entire, green and glabrous above when mature, whitish-canescant beneath, 5-nerved from the base, the apex acute or acuminate, the base obtuse or rounded, the lateral venation delicate, spreading, the petioles 1–2 cm. long; panicles narrow; calyx sharply tetragonal, canescent, its tube about 5 mm. long, its subulate outer lobes 6–7 mm. long; petals white, obovate, subtruncate, about 10 mm. long; anthers yellow, 5 mm. long.

Thickets, and mountain forests in wet districts, Porto Rico. Endemic.

2. *Menendezia Urbanii* (Cogn.) Britton.

Tetrazygia Urbanii Cogn. Jahrb. Bot. Gart. Berlin 4: 278. 1886.

A tree, 5–10 m. high, or shrubby, the twigs, inflorescence, petioles and under leaf-surfaces canescent. Leaves oblong to oblong-lanceolate, chartaceous, 6–12 cm. long, 5-nerved from the base, green and glabrous above, when mature, densely whitish-canescant beneath, the apex acuminate, the base rounded or narrowed, the petioles 1.5–3 cm. long; panicles rather broad, about as long as the leaves; calyx-tube tetragonal, canescent, about 6 mm. long, its lobes narrowly ovate, obtusish, 3–4 mm. long; petals white, obovate, rounded, about 8 mm. long; anthers yellow, 4–5 mm. long.

In forests at middle altitudes in the Luquillo Mountains. Similar to the preceding species, but the calyx-lobes quite different. Endemic.

3. *Menendezia biflora* (Cogn.) Britton.

Calyconium biflorum Cogn. Jahrb. Bot. Gart. Berlin 4: 276. 1886.

Tetrazygia Krugii Cogn. in DC. Mon. Phan. 7: 719. 1891.

Tetrazygia biflora Urban, Repert. 17: 405. 1921.

A tree, up to about 10 m. in height, the slightly angular twigs, the petioles, inflorescence and under leaf-surfaces puberulent. Leaves ovate-oblong to oblong-lanceolate, chartaceous, 6–12 cm. long, 5-nerved from the base, green on both sides, minutely scurfy above or glabrous when mature, the apex short-acuminate, the base rounded or narrowed, the petioles 1–2.5 cm. long; panicles about as long as the leaves or shorter; calyx-tube 6–7 mm. long, its ovate-triangular lobes nearly as long; petals obovate, acute, about 10 mm. long.

Thickets and forests, Porto Rico, at middle and higher elevations in moist or wet districts. Endemic.

5. **TETRAZYGIA** L. C. Rich.; DC. Prodr. 3: 172. 1828.

Trees or shrubs, the foliage often scurfy, with petioled, entire or toothed leaves, and rather small flowers in terminal panicles or corymbs. Calyx constricted above the ovary, its limb 4–5-lobed or subtruncate. Petals 4 or 5, obovate. Stamens 8 or 10, nearly equal; filaments subulate; anthers linear, opening by a pore. Ovary 4–5-celled; style curved, filiform; stigma minute. Fruit a 4–5-celled fleshy berry. [Greek, referring to the 4-parted flowers of the type species.] About 16 species, of the West Indian region. Type species: *Melastoma discolor* L.

Leaves sessile, crenulate.

1. *T. crotonifolia*.

Leaves petioled, entire or nearly so.

Panicle corymbiform, many-flowered.

2. *T. angustifolia*.

Panicle pyramidal, few-flowered.

3. *T. elaeagnoides*.

1. *Tetrazygia crotonifolia* (Desv.) DC. Prodr. 3: 172. 1828.

Melastoma crotonifolia Desv. in Lam. Encycl. 4: 43. 1797.

A shrub, about 1 m. high or less, the slender but stiff, terete branches glabrous. Leaves lanceolate to ovate, sessile, rigid, 3–8 cm. long, acuminate, 3–5-nerved from the base with the lateral venation delicate and distant, yellow-green and glabrous above, pale-tomentulose beneath, the apex acuminate or acute, the base cordate; panicles loosely few-flowered, about as long as the leaves or shorter, glabrous; pedicels filiform, purple, about 1 cm. long or shorter; calyx glabrous, purple, its tube oblong, 3–4 mm. long, its lobes short, acute; petals ovate, white or pink, about 4 mm. long; fruit black, ovoid, about 5 mm. long.

Hillsides and cliffs, at middle altitudes in moist parts of the western districts of Porto Rico:—Hispaniola.

2. *Tetrazygia angustifolia* (Sw.) DC. Prodr. 3: 172. 1828.*Melastoma angustifolia* Sw. Prodr. 71. 1788.*Miconia angustifolia* Griseb. Fl. Br. W. I. 258. 1860.

A small tree, reaching, on St. Jan, a maximum height of about 12 m., usually much smaller, often shrubby, the many slender twigs densely canescent, the branches nearly erect. Leaves lanceolate or linear-lanceolate, 4–8 cm. long, 4–12 mm. wide, subchartaceous, entire, strongly 3-nerved from the base with the lateral venation prominent beneath, yellow green and glabrous above, stellate-canescens beneath, the apex acuminate, the base narrowed or obtuse, the slender petioles 5–10 mm. long; panicles corymbiform, many-flowered, about as long as the leaves, stellate-canescens; pedicels short; calyx about 1.5 mm. long, its lobes triangular, acute; petals yellowish or pink, obovate, 2 mm. long; fruit blue-black, globose, about 5 mm. in diameter.

Attributed to Porto Rico by Sessé and Mocino; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Montserrat; Guadeloupe; Dominica; Martinique. Recorded by Swartz from Jamaica, and by Cogniaux from Trinidad, both records perhaps erroneous. Shoots from stumps bear thin glabrate larger leaves, green on both sides.

3. *Tetrazygia elaeagnoides* (Sw.) DC. Prodr. 3: 172. 1828.*Melastoma elaeagnoides* Sw. Prodr. 72. 1788.

A tree, up to about 10 m. high, often smaller, sometimes shrubby, much branched, the slender twigs, the petioles and inflorescence densely scurfy-puberulent, the bark separating in narrow flakes. Leaves oblong-lanceolate or narrowly oblong, chartaceous, 3-nerved from a little above the base, with the delicate lateral venation spreading, green and glabrous above, canescent beneath, the apex acute or obtuse, the base narrowed, the petioles 4–16 mm. long; panicles loosely few-flowered, mostly shorter than the leaves; pedicels short; calyx scurfy, about 5 mm. long, its short lobes obtuse; petals white, obovate, about 10 mm. long; anthers linear, 5–6 mm. long; fruit depressed-globose, 4-lobed, 6–8 mm. thick.

Hillsides, thickets and woodlands, Porto Rico, at lower and middle elevations in dry and moist districts; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Hispaniola; recorded from Montserrat. CENIZO. VERDE SECO. KRE KRE.

6. **TAMONEA** Aubl. Pl. Guian. 1: 441, pl. 175. 1775.

Trees or shrubs, the leaves ample, the inflorescence large, terminal, paniculate, the flowers large, 5–6-parted. Calyx oblong or oblong-cylindric, its limb truncate or merely denticulate. Petals obovate, rounded or retuse; stamens twice as many as the petals; anthers linear-subulate, elongated, mostly curved or falcate, minutely 1-porose. Fruit baccate, many-seeded. [Guiana name.] About 40 species of tropical America. Type species: *Tamonea guianensis* Aubl. In two slightly differing editions of the "Plantes de Guiane" Aublet published this genus both as *Tamonea* and as *Fothergilla*, but there is an earlier genus *Fothergilla* of Linnaeus.

Calyx tomentose; leaves stellate-pubescent beneath.
Calyx glabrous; leaves scurfy beneath.

1. *T. macrophylla*.
2. *T. guianensis*.

1. *Tamonea macrophylla* (D. Don) Krasser in E. & P. Nat. Pfl. 37: 188. 1893.*Chitonia macrophylla* D. Don, Mem. Wern. Soc. 4: 319. 1823.*Diplochita serrulata* DC. Prodr. 3: 177. 1828.*Miconia macrophylla* Triana, Trans. Linn. Soc. 28: 103. 1871.

A small tree, up to about 12 m. high, or sometimes shrubby, the stout twigs compressed, densely short-tomentose. Leaves ovate to elliptic-ovate, charta-

ceous, 1–3 dm. long, 5–7-nerved and with many slender lateral veins, closely crenulate-serrulate, dark green and glabrous or nearly so above, densely stellate-pubescent and whitish beneath, the apex short-acuminate or acute, the base rounded or subcordate, the stout pubescent petioles much shorter than the blades; panicles many-flowered, tomentose, as long as the leaves or shorter; flowers 6-parted, sessile or nearly so; bracts about 5 mm. long; calyx densely tomentulose, subtruncate, oblong, about 7 mm. long; petals white or pink, 6–8 mm. long; filaments hirtellous; anthers violet, linear-subulate, elongated; fruit subglobose, about 6 mm. in diameter. [*M. holosericea* of Bello, not of de Candolle.]

Hillside thickets and mountain forests in wet or moist districts of Porto Rico, ascending to 500 meters altitude or higher; St. Croix; St. Thomas (according to Eggers):—Jamaica; Cuba; Hispaniola; Trinidad; continental tropical America.

2. *Tamonea guianensis* Aubl. Pl. Guian. 1: 441. 1775.

Diplochaeta Fothergilla DC. Prodr. 3: 176. 1828.

Miconia guianensis Cogn. Jahrb. Bot. Gart. Berlin 4: 280. 1886.

Tamonea Fothergilla Cook. & Collins, Contr. U. S. Nat. Herb. 8: 249. 1903.

A shrub, or small tree up to about 7 m. high, the young twigs scurfy-puberulent. Leaves oblong, elliptic, or ovate, chartaceous, 8–20 cm. long, 5-nerved and with many spreading slender lateral veins, green and glabrous above, pale and more or less scurfy beneath, entire or sparingly denticulate, the apex acuminate, the base obtuse or subcordate, the petioles 2–5 cm. long; panicles many-flowered, rather narrow, often longer than the leaves; flowers 6-parted, very short-pedicelled; bracts oblong, canescent, 6–10 mm. long, caducous; calyx glabrous, its lobes broad, nearly 1 mm. long; petals white, 6–8 mm. long; filaments glabrous; anthers yellow, elongated; fruit subglobose, about 6 mm. in diameter. [*M. punctata* of Bello, not of Don.]

Woodlands and forests, Porto Rico, in wet or moist districts, ascending to high elevations; Tortola:—Jamaica; Cuba; Hispaniola; St. Kitts to Trinidad; continental tropical America. Doubtfully recorded from Porto Rico by Cogniaux as *Miconia splendens*.

7. *MICONIA* R. & P. Syst. 1: 104. 1798.

Trees or shrubs, the foliage various, the inflorescence terminal, paniculate or corymbose, the flowers mostly small and 5-parted. Calyx hemispheric, subglobose or campanulate, mostly small, its limb toothed or lobed. Petals oblong or obovate. Stamens usually twice as many as the petals; anthers subulate, linear, obovoid or cuneate, 1–4-porose. Fruit baccate, mostly globose. [Commemorates D. Micon, a Spanish physician.] An immense genus of tropical America, the species probably 600 or more. Type species: *Miconia pulverulenta* R. & P.

1. Anthers elongated, subulate.

2. Anthers short.

a. Anthers linear.

*Panicle-branches simple, spike-like; leaves subamplexicaul, sessile.

**Panicle compound; leaves not amplexicaul.

†Leaves glabrous, or nearly so, beneath.

Leaves 3–5-nerved from the base.

Young branches densely pilose; leaves narrowed at the base.

Young branches furfuraceous; leaves rounded or narrowed at the base.

Leaves 5-nerved above the base.

††Leaves pubescent or lepidote beneath.

Mature leaves glabrous or loosely stellate-tomentulose above.

Leaves densely stellate-tomentose on both sides.

Leaves densely brown-lepidote beneath.

1. *M. thomasiana*.

2. *M. impatiolaris*.

3. *M. affinis*.

4. *M. laevigata*.

5. *M. prasina*.

6. *M. rubiginosa*.

7. *M. lanata*.

8. *M. punctata*.

b. Anthers obovoid-oblong or cuneiform.

*Anthers apically 1-porose.

Flowers secund on the panicle-branches; leaves serrulate.

Flowers not secund; leaves entire, subcordate.

**Anthers 2-porose; leaves entire.

***Anthers 2-rimose.

†Leaves bullate, setulose above, deeply cordate at base, 7-nerved.

††Leaves glabrous above, narrowed or cordate at base, 3-5-nerved.

Panicle pyramidal or elongated; leaves denticulate.

Panicle corymbiform, broad; leaves entire.

Leaves chartaceous, oblong-lanceolate; panicles loose.

Leaves coriaceous, ovate; panicles very dense.

9. *M. racemosa*.

10. *M. pachyphylla*.

11. *M. ietrandra*.

12. *M. foveolata*.

13. *M. Sintenisii*.

14. *M. subcorymbosa*.

15. *M. pycnoneura*.

1. *Miconia thomasiana* DC. Prodr. 3: 189. 1828.

Miconia vernicosa Naud. Ann. Sci. Nat. III. 16: 191. 1851.

Acinodendrum thomasianum Kuntze, Rev. Gen. Pl. 953. 1891.

Tamonea thomasiana Cook & Collins, Contr. U. S. Nat. Herb. 8: 249. 1903.

A shrub, or a little tree about 4 mm. high, the young twigs and the inflorescence somewhat scurfy. Leaves ovate to elliptic, coriaceous, 5-nerved, with slender lateral veins, 5-15 cm. long, green and glabrous on both sides, distantly serrulate with short curved teeth or entire, the apex acute or acuminate, the base rounded or subcordate, the setulose petioles 15 mm. long or less; panicles diffusely several-many-flowered, commonly longer than the leaves; longer pedicels filiform, 2 cm. long or less; flowers 5-parted; calyx campanulate, somewhat scurfy, about 3 mm. long, its spreading limb obscurely lobed; petals rose or pink, retuse, 5-6 mm. long; anthers subulate, elongated; fruit globose, about 6 mm. in diameter.

Thickets and hillsides at lower elevations, in moist parts of the northern and eastern districts of Porto Rico, mostly near the coasts; Tortola; doubtfully and apparently erroneously recorded as found on St. Thomas. Endemic.

2. *Miconia impetiolearis* (Sw.) D. Don, Mem. Wern. Soc. 4: 316. 1823.

Melastoma impetiolearis Sw. Prodr. 70. 1788.

Miconia Wydleriana DC. Mem. Mel. 77. 1828.

Tamonea impetiolearis Cook & Collins, Contr. U. S. Nat. Herb. 8: 249. 1903.

A small tree, 4-10 m. high, or shrubby, the twigs and inflorescence densely scurfy-tomentulose. Leaves elliptic, oblong or ovate-oblong, chartaceous, sessile, 2-5 dm. long, 5-nerved, and with many lateral veins, denticulate, dark green and glabrous above, paler and densely stellate-tomentulose beneath, the apex acuminate, the base subauriculate; panicles densely many-flowered, the branches spike-like, mostly shorter than the leaves; flowers small, sessile; calyx densely stellate-scurfy, about 3 mm. long, with 5 short lobes; petals white, retuse, about 2 mm. long; fruit globose, about 4 mm. in diameter. [*M. elata* of Bello, not of de Candolle.]

Thickets, woodlands, valleys and shaded hillsides in moist or wet districts of Porto Rico, ascending to higher elevations; recorded from St. Thomas and St. Croix, but not found on those islands in many years:—Jamaica; Cuba; Hispaniola; St. Eustatius; Guadeloupe; Dominica; continental tropical America.

3. *Miconia affinis* DC. Prodr. 3: 187. 1828.

A small tree, up to about 8 m. high, the young twigs densely pilose. Leaves oblong to oblong-obovate, rigid, entire, 15-20 cm. long, 6-8 cm. wide, 5-nerved with the transverse venation prominent, dark green and glabrate above, stellulate-punctate beneath, the apex short-acuminate, the base obtuse, the petioles 1-2 cm. long; panicles pyramidal, about as long as the leaves; flowers sessile or nearly so; calyx about 2.5 mm. long, obscurely 5-lobed; petals oblong, obtuse, about 3 mm. long; fruit about 4 mm. in diameter.

Monte Santo de Leon, near Juncos, Porto Rico, collected only by Sintenis:—Cuba; French Guiana.

4. *Miconia laevigata* (L.) DC. Prodr. 3: 188. 1828.

Melastoma laevigata L. Syst. ed. 10, 1022. 1759.

Melastoma portoricensis Spreng. Neue Ent. 3: 61. 1822.

Miconia pyramidalis DC. Prodr. 3: 188. 1828.

Acinodendrum laevigatum Kuntze, Rev. Gen. Pl. 244. 1891.

Tamonea laevigata Krasser in E. & P. Nat. Pfl. 37: 142. 1893.

A shrub, or a small tree 4–6 m. high, the slender twigs, the inflorescence and the petioles finely scurfy. Leaves oblong to ovate-oblong or elliptic, submembranous, 8–20 cm. long, 5-nerved from the base, serrulate or entire, green on both sides, glabrous above, usually scurfy on the veins beneath, the lateral venation slender, the apex acuminate, the base rounded or narrowed, the slender petioles about 3 cm. long or less; panicles many-flowered, as long as the leaves or shorter; flowers small, short-pedicelled or sessile; calyx about 3 mm. long, its teeth acute; petals white or pale pink, 3–4 mm. long; fruit blue, globose, about 3 mm. in diameter. [*M. ascendens* of Sprengel, not of Swartz; *M. racemosa* of Bello, not of de Candolle; *M. trinervis* of Millspaugh, not of Don; *M. prasina* of Millspaugh, not of de Candolle.]

Thickets, hillsides, woodlands and forests, Porto Rico, in wet or moist districts; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Jamaica; Cuba; Hispaniola; St. Martin to Trinidad; Margarita; continental tropical America.

5. *Miconia prasina* (Sw.) DC. Prodr. 3: 188. 1828.

Melastoma prasina Sw. Prodr. 69. 1788.

Miconia collina DC. Prodr. 3: 185. 1828.

Acinodendrum prasinum Kuntze, Rev. Gen. Pl. 245. 1891.

Tamonea prasina Krasser in E. & P. Nat. Pfl. 37: 142. 1893.

A shrub, or a small tree, occasionally 10 m. high, the slender young twigs scurfy-puberulent or glabrous. Leaves oblong to oblong-lanceolate, subchartaceous, 8–20 cm. long, repand-denticulate or entire, 5-nerved above the base, glabrous and nearly equally bright green on both sides, or dark green above, pale and puberulent beneath, the apex acute or acuminate, the base narrowed, the petioles 1–3 cm. long, margined or marginless; panicles ample, pyramidal, many-flowered, often as long as the leaves, glabrous or scurfy; flowers 5-parted, sessile or very nearly so; calyx about 3 mm. long; petals white, about 3 mm. long; anthers linear, 1-porose; fruit blue or purple, about 3 mm. in diameter. [*M. trichotoma* of Bello, not of de Candolle.]

Thickets, hillsides, valleys and mountain forests, Porto Rico, in wet or moist districts, ascending to high elevations; Tortola; erroneously recorded from St. Thomas:—Jamaica; Cuba; Hispaniola; Grenada; Trinidad; Margarita; continental tropical America.

6. *Miconia rubiginosa* (Bonpl.) DC. Prodr. 3: 183. 1828.

Melastoma rubiginosa Bonpl. Melast. 109. 1816.

Tamonea rubiginosa Krasser in E. & P. Nat. Pfl. 37: 142. 1893.

A shrub, or a small tree 4–8 m. high, the stout twigs, the inflorescence, the petioles and the under leaf-surfaces densely brownish-tomentose. Leaves ovate or elliptic-ovate, subcoriaceous, 6–13 cm. long, entire, dark green and glabrous or loosely minutely stellate-pubescent above, 5-nerved, the apex acute or acuminate, the base rounded or subcordate, the lateral venation slender, spreading, the stout short petioles 3–8 mm. long; panicles many-flowered, as long as the leaves or longer; flowers 5-parted, sessile, clustered; calyx tomentulose, about 3 mm. long; petals white, about 2 mm. long; anthers linear, short, 1-porose; fruit black, about 3 mm. in diameter.

Mountain woods and thickets, western districts of Porto Rico:—Hispaniola; continental tropical America.

7. **Miconia lanata** (DC.) Triana, Trans. Linn. Soc. 27: 113. 1871.

Clidenia lanata DC. Prodr. 3: 162. 1828.

Twigs, leaves and inflorescence densely tomentose. Leaves ovate, short-petioled, entire, subchartaceous, 8–20 cm. long, 5-nerved from the base with the lateral venation slender, the apex short-acuminate, the base rounded or subcordate; panicles as long as the leaves or longer, the fragrant 5-parted flowers glomerate on its branches; calyx 5-lobed, about 4 mm. long; petals white, 3–4 mm. long; anthers linear, short, 1-porose; fruit black, about 5 mm. in diameter.

Recorded by Cogniaux as collected in Porto Rico by Bertero:—Cuba; St. Vincent; Trinidad; northern South America.

8. **Miconia punctata** (Desv.) D. Don, Mem. Wern. Soc. 4: 316. 1823.

Melastoma punctata Desv.; Lam. Encycl. 4: 50. 1797.

A small tree, about 4 m. high, the stout angular twigs lepidote. Leaves oblong to oblanceolate, 1–2.5 dm. long, subcoriaceous, entire, 3-nerved from the base with the slender lateral venation spreading, dark green and glabrous above, densely brownish-lepidote beneath, the apex acute or acuminate, the base narrowed or cuneate, the stout petioles 2 cm. long or less; panicles large, many-flowered; calyx about 2 mm. long; petals about 3 mm. long; anthers short, narrow; fruit about 3 mm. in diameter. [*Miconia fulva* of Cogniaux, in part; *Miconia chrysophylla* of Urban, in part.]

Mountain forests near Utuado:—Cuba; Hispaniola; Guatemala; Bolivia.

9. **Miconia racemosa** (Aubl.) DC. Prodr. 3: 179. 1828.

Melastoma racemosa Aubl. Pl. Guian. 1: 406. 1775.

Miconia brachypoda DC. Prodr. 3: 180. 1828.

Tamonea racemosa Cook & Collins, Contr. U. S. Nat. Herb. 8: 249. 1903.

A shrub, 2–3 m. high, or occasionally a small tree about 4 m. high, the twigs with a ring of hairs at the nodes, otherwise glabrous. Leaves obovate to elliptic, submembranous, 5-nerved from the base with the lateral venation prominent and ascending, serrulate, ciliate, green on both sides but paler beneath than above, stellate-puberulent when young, glabrous when mature, the apex acute, short-acuminate or obtuse, the base mostly obtuse, the rather stout petioles 1–4 cm. long; flowers sessile and secund on the branches of the panicles; calyx about 2 mm. long; petals white, pink or purple, 1.5–2 mm. long; anthers oblong, purple, short; fruit dark blue to black, about 3 mm. in diameter. [*Melastoma decussatum* of Sprengel, not of Vahl.]

Banks, thickets and woodlands in moist or wet districts, Porto Rico, ascending to higher elevations:—Jamaica; Hispaniola; Grenada; Tobago; Trinidad; northern South America.

10. **Miconia pachyphylla** Cogn. Jahrb. Bot. Gart. Berlin 4: 279. 1886.

Acinodendrum pachyphyllum Kuntze, Rev. Gen. Pl. 952. 1891.

A tree, up to 10 m. high, the young twigs flattened, densely scurfy. Leaves ovate to oblong-lanceolate, subcoriaceous, 8–15 cm. long, 5-nerved from the base, with the delicate lateral venation widely spreading, entire, dark green, glabrous above, scurfy on the veins beneath, the apex acute, acuminate or blunt, the base cordate or subcordate, the petioles 1–3 cm. long; panicles several-many-flowered, shorter than the leaves; flowers 4-parted, short-pedicelled; calyx about 2.5 mm.

long; petals oblong, purple, about 4 mm. long; anthers short, 1-porose; fruit blue-black, about 5 mm. in diameter.

Forests at higher elevations in the eastern mountains of Porto Rico. Endemic.

11. **Miconia tetrandra** (Sw.) D. Don; London, Hort. Brit. 174. 1830.

Melastoma tetrandra Sw. Prodr. 72. 1788.

Tetrazygia tetrandra DC. Prodr. 3: 172. 1828.

Cremanium tetrandrum Griseb. Fl. Br. W. I. 262. 1860.

A tree, up to about 15 m. high, or sometimes shrubby, the obtusely 4-angled young twigs, the petioles, the under leaf-surfaces and the inflorescence finely scurfy. Leaves oblong to oblong-lanceolate, subchartaceous, entire, 8–20 cm. long, 3-nerved with the lateral venation delicate, green on both sides but paler beneath than above, the apex acuminate, the base rounded or obtuse, the upper surface glabrous or nearly so, the petioles 2–4 cm. long; panicles pyramidal, many-flowered, often longer than the leaves; flowers 4-parted, sessile; calyx subtruncate, about 1.5 mm. long; petals white or greenish, about 1 mm. long; anthers short, 2-porose; fruit globose, black, 3–4 mm. in diameter.

Mountain forests at high elevations in wet districts of Porto Rico;—Jamaica; Cuba; Guadeloupe; Dominica; Grenada; Trinidad (?).

12. **Miconia foveolata** Cogn. Jahrb. Bot. Gart. Berlin 4: 281. 1886.

Acinodendrum foveolatum Kuntze, Rev. Gen. Pl. 951. 1891.

A shrub, or a small tree 5–10 m. high, the twigs, petioles, inflorescence and calyx pilose with black gland-tipped hairs. Leaves ovate to ovate-elliptic, 7-nerved with numerous spreading lateral veins, stiff, subchartaceous, entire, ciliate, 8–16 cm. long, the upper surface scabrous-bullate and setulose, the under surface foveolate-reticulate, the apex acute or acuminate, the base rounded or cordate, the stout petioles 3–9 mm. long; panicles several-many-flowered, as long as the leaves or shorter; flowers 5-parted, short-pedicelled; calyx subcampanulate, its tube about 4 mm. long, its lobes 1–1.5 mm. long; petals rose or white, about 3 mm. long; anthers obovoid; fruit blue, about 7 mm. in diameter.

Forests at high elevations in the eastern mountains of Porto Rico. Endemic.

13. **Miconia Sintenisii** Cogn. Jahrb. Bot. Gart. Berlin 4: 281. 1886.

Acinodendrum Sintenisii Kuntze, Rev. Gen. Pl. 952. 1891.

A large shrub, or a small tree up to about 8 m. in height, the twigs, petioles and inflorescence glabrous or nearly so. Leaves ovate to elliptic-ovate, coriaceous, 8–25 cm. long, 5-nerved from the base with the delicate lateral venation spreading, denticulate, green on both sides but paler beneath than above, the apex acute, the base cordate or rounded, the upper surface glabrous, the under side with minute tufts of short hairs, the stout petioles 2–5.5 cm. long; panicles long-peduncled, several-many-flowered; pedicels 2–6 mm. long; calyx urceolate, about 6 mm. long, its lobes triangular; petals white, 6–7 mm. long; anthers short, obovoid; fruit light blue, about 8 mm. in diameter.

Mountain forests, Porto Rico, at middle and higher elevations. Endemic.

14. **Miconia subcorymbosa** Britton, sp. nov.

Miconia cubensis latifolia Cogn. in DC. Mon. Phan. 7: 932. 1891.

Miconia cubensis nervulosa Cogn. loc. cit. 933. 1891.

Miconia cubensis minor Cogn. loc. cit. 1891.

A tree, 5–10 m. high, or shrubby, glabrous or very nearly so throughout. Leaves oblong to oblong-lanceolate, subchartaceous, entire, 8–17 cm. long,

5-nerved from the base with the two lateral nerves marginal and the transverse veins numerous and delicate, bright green above, paler beneath, the apex acuminate, the base narrowed or obtuse, the petioles 2–4 cm. long; panicles broad, subcorymbose, many-flowered, about as long as the leaves; pedicels slender, 3–8 mm. long; flowers mostly 5-parted; calyx-tube about 4 mm. long, its ovate lobes about 1 mm. long; petals white, 3–4 mm. long; fruit globose, blue or turning white, about 6 mm. in diameter. [*M. laevigata* of Bello, not of de Candolle; *Charianthus coccineus* of Cogniaux, as to the Porto Rico plant; included by Cogniaux and by Urban in *Miconia cubensis* (Griseb.) C. Wright.]

Mountain forests, Porto Rico, at middle and higher elevations:—Hispaniola (ex Cogniaux); Cuba; differs from *M. cubensis* in foliage and in inflorescence. Type from Indiera Baja (Britton 7390).

15. ***Miconia pycnoneura*** Urban, Report. 17: 162. 1921.

Miconia Grisebachii reticulata Cogn. Jahrb. Bot. Gart. Berlin 4: 280. 1886.

A shrub, or a small tree up to 7 m. high, the rather stout 4-angled twigs and the inflorescence minutely scurfy. Leaves ovate to elliptic-ovate, coriaceous, entire, 8–14 cm. long, 5-nerved from the base, with the transverse veins very numerous, impressed above, rather prominent beneath, green on both sides, the apex acute or acuminate, the base rounded or subcordate, the petioles 3–5 cm. long; panicles corymbiform, densely many-flowered, often broader than high, 10 cm. broad or less; pedicels 2–6 mm. long; calyx about 2 mm. long, its broad lobes much shorter than the tube; petals about 2 mm. long; fruit globose, 4–5 mm. in diameter.

Forests at higher elevations in the eastern mountains of Porto Rico. Endemic.

Miconia stenostachya (Schr. & Mart.) DC., recorded by authors as collected by Finlay on St. Thomas, was really from Trinidad. [*Melastoma stenostachya* Schr. & Mart.; *M. argyrophylla* of Benthham, not of de Candolle.]

Miconia Acinodendrum (L.) Triana, also recorded by authors as collected by Finlay on St. Thomas, was really from Trinidad. West recorded it from St. Croix, apparently erroneously, as it is otherwise known only from Martinique southward. [*Melastoma Acinodendrum* L.; *Tshudya berbiceana* Griseb.]

Urban records another *Miconia*, known only from a barren specimen collected by Krug (no. 413) near Mayaguez.

8. **CALYCOGONIUM** DC. Prodr. 3: 168. 1828.

Shrubs or trees, with rather small, mostly entire and coriaceous 3–5-nerved leaves, the white flowers variously clustered or solitary, terminal or also axillary, 4–6-parted. Calyx various, in some species 4-angled, its lobes subulate, often as long as the tube or longer. Petals oblong or obovate, mostly obtuse. Stamens twice as many as the petals, the anthers linear or oblong, 1-porose, the connective unappendaged. Ovary 3–5-celled. Fruit globose, baccate, few-seeded. [Greek, angled calyx.] About 30 species, natives of the West Indies. Type species: *Calycogonium stellatum* (Vahl) DC.

Flowers 4-parted; leaves oblong or obovate, entire.

1. *C. squamulosum*.

Flowers 6-parted; leaves oval or suborbicular, bullate, serrate, scabrous.

2. *C. Krugii*.

1. ***Calycogonium squamulosum*** Cogn. Jahrb. Bot. Gart. Berlin 4: 277. 1886.

A tree, 8–15 m. high, the young twigs, petioles, inflorescence and calyx densely scaly. Leaves oblong to obovate, coriaceous, 4–8 cm. long, entire, 3–

nerved with the 2 lateral nerves near the margin and the transverse venation rather delicate, the apex obtuse or acutish, the base narrowed, the petioles 8–12 mm. long; peduncles terminal and in the upper axils, about as long as the petioles, mostly 3-flowered, the flowers nearly sessile, 4-parted; calyx-tube narrowly campanulate, about 5 mm. long, its broad lobes 1–2 mm. long; petals white, ovate, about 6 mm. long.

Forcets at middle and higher elevations in the eastern mountains of Porto Rico. Endemic.

2. **Calycogonium Krugii** Cogn. Jahrb. Bot. Gart. Berlin 4: 278. 1886.

A shrub, 3 m. high or less, much branched, the twigs, petioles and calyx densely setose-lepidote. Leaves oval to elliptic or orbicular, rigid, 2–4.5 cm. long, serrulate, 5-nerved with the lateral venation slender, bullate above, densely lepidote beneath, the apex and base both obtuse or rounded, the petioles 4 mm. long or less; flowers solitary at the ends of twigs, sessile, 6-parted; calyx-tube subcampanulate, about 5 mm. long, its subulate lobes 7–9 mm. long, petals white, obovate, obtuse, about 15 mm. long; fruit globose, setose, about 12 mm. in diameter.

Summit of Mt. Cerrote near Adjuntas, and on Mt. Alegrillo and vicinity near Maricao. Endemic.

9. **HETEROTRICHUM** DC. Prodr. 3: 173. 1828.

Shrubs or small trees, mostly hispid, hirsute or glandular-hirsute, with petioled, 5–7-nerved leaves and rather large, 5–9-parted flowers in terminal panicles. Calyx-tube campanulate to subglobose, its lobes mostly subulate and elongated. Petals obovate, spreading. Stamens twice as many as the petals; filaments filiform; anthers narrow, 1-porose, the connective unappendaged. Ovary 6–12-celled; style slender or stout; stigma small. Fruit a many-seeded berry. [Greek, various pairs.] About 12 species of tropical America. Type species: *Heterotrichum angustifolium* DC.

Leaves broadly ovate, membranous.

Leaves lanceolate to oblong-lanceolate, subcoriaceous.

1. *H. cymosum*.

2. *H. angustifolium*.

1. **Heterotrichum cymosum** (Wendl.) Urban, Symb. Ant. 4: 462. 1910.

Melastoma cymosum Wendl.; Spreng. Syst. 2: 299. 1825.

Heterotrichum Eggersii Cogn. Jahrb. Bot. Gart. Berlin 4: 282. 1886.

A shrub, or a small tree 5–10 m. in height, the twigs, petioles and inflorescence densely stellate and glandular-pubescent, somewhat viscid. Leaves long-petioled, the blades very broadly ovate, submembranous, 8–15 cm. long, denticulate, ciliate, 7-nerved from the base with the transverse veins numerous and slender, pale, densely stellate-pubescent, and setulose on the veins beneath, bright green, scabrate and setulose above, the apex acuminate, the base cordate, the stout petioles 2–10 cm. long; panicles broad, few-several-flowered, shorter than the leaves; pedicels short or none; calyx-tube subcampanulate, 6–7 mm. long, its outer lobes 5–6 mm. long; petals white, about 9 mm. long; fruit globose, glandular-hirsute, about 12 mm. in diameter.

Thickets, forests and rocky hillsides in wet or moist districts, Porto Rico, ascending to higher elevations. Endemic. TERCIOPELO.

2. **Heterotrichum angustifolium** DC. Prodr. 3: 173. 1828.

A shrub, the twigs, petioles, inflorescence and under leaf-surfaces densely stellate-tomentulose and long-setulose, not glandular. Leaves lanceolate to

oblong-lanceolate, coriaceous, rigid, short-petioled, entire, ciliate, 5-nerved, 6–12 cm. long, pale beneath, the transverse venation spreading, the apex acuminate, the base rounded or subcordate, the petioles 1–2 cm. long; inflorescence few-several-flowered, shorter than the leaves; calyx-tube urceolate, about 6 mm. long, the exterior lobes about as long; petals white, 8–10 mm. long; fruit globose, nearly black, described as edible.

Recorded by Cogniaux as collected in Porto Rico by Riedlé:—Known otherwise only from Hispaniola.

10. **MECRANIUM** Hook. f. in Benth. & Hook. Gen. Pl. 1: 980. 1867.

Glabrous shrubs or small trees, with petioled oblong, ovate or lanceolate, 3–5-nerved leaves and small 4–5-parted flowers in short lateral or axillary panicles. Calyx-tube ovoid, campanulate or hemispheric, the short lobes obtuse. Petals obovate, obtuse or retuse. Stamens twice as many as the petals, the filaments subulate, the anthers linear, 1–2-porse, the base of the connective prolonged, not appendaged. Ovary 3–5-celled; style short; stigma small. Fruit a small globose berry. [Anagram of *Cremanium*.] About 10 species, natives of the Greater Antilles. Type species: *Cremanium virgatum* (Sw.) Griseb.

1. **Mecranium amygdalinum** (Desr.) C. Wright; Sauvalle, Anales Acad. Habana 5: 435. 1869.

Melastoma amygdalina Desr. in Lam. Encycl. 4: 35. 1797.

Ossaea amygdalina DC. Prodr. 3: 169. 1828.

Cremanium amygdalinum Griseb. Fl. Br. W. I. 261. 1860.

Tamonea integrifolia Cook & Collins, Contr. U. S. Nat. Herb. 8: 249. 1903.

A shrub, or a small tree 5–8 m. high. Leaves lanceolate to oblong or ovate, subchartaceous, 5–15 cm. long, green on both sides but somewhat paler beneath than above, serrulate or entire, 3-nerved from above the base and with a pair of slender marginal veins, the transverse venation slender, the apex acuminate, the base narrowed or obtuse, the slender petioles 1–3 cm. long; panicles few-several-flowered, about as long as the petioles; pedicels short; calyx ovoid, about 2 mm. long; petals white, about 1 mm. long; fruit globose, black, 2–3 mm. in diameter.

Mountain forests in wet or moist districts, Porto Rico, mostly at middle and higher elevations:—Jamaica; Cuba; Hispaniola. Erroneously attributed to St. Thomas. Races differ in shape and width of the leaves.

11. **CLIDEMIA** D. Don, Mem. Wern. Soc. 4: 306. 1823.

Shrubs, mostly hirsute or villous, with 3–5-nerved leaves, the small 4–5-parted flowers in axillary panicles or fascicles. Calyx-tube campanulate to urceolate, variously lobed. Petals obtuse or retuse. Stamens mostly twice as many as the petals; the filaments glabrous, filiform or subulate, the anthers linear, 1-porse, the connective not prolonged. Ovary 3–5-celled; style short or long; stigma very small. Berry usually hirsute, many-seeded. [Dedicated to Clidæmus, an ancient Greek physician, who studied plant diseases.] About 100 species or more, natives of tropical America. Type species: *Clidemia neglecta* D. Don.

Flowers 5–6-parted.

Inner calyx-teeth very short or none.

Inner calyx-teeth 2–3 mm. long.

Flowers 4-parted.

Leaves densely long-hirsute on both sides.

Leaves sparsely short-hirsute on both sides.

1. *C. hirta*.

2. *C. strigillosa*.

3. *C. polystachya*.

4. *C. domingensis*.

1. *Clidemia hirta* (L.) D. Don, Mem. Wern. Soc. 4: 309. 1823.

Melastoma hirta L. Sp. Pl. 390. 1753.

Clidemia crenata DC. Prodr. 3: 157. 1828.

A shrub, 1.5 m. high or less, the rather slender twigs, the petioles and inflorescence densely setose. Leaves ovate or elliptic-ovate, membranous, 5–10 cm. long, green and setose on both sides, 5–7-nerved from the base with the transverse venation slender, denticulate, the apex acute or short-acuminate, the base rounded or subcordate, the petioles about 2 cm. long or shorter; panicles short, few-flowered; pedicels 2–6 mm. long; flowers 5–6-parted; calyx-tube about 5 mm. long, its inner teeth very short, the outer 2–4 mm. long, setose; petals white, about 8 mm. long; berry globose or ovoid, loosely strigose, black, about 6 mm. in diameter.

Banks, hillsides and woodlands in moist or wet districts, Porto Rico, ascending to higher elevations; recorded from St. Thomas, perhaps erroneously; Tortola:—Jamaica; Cuba; Hispaniola; St. Kitts to Trinidad; continental tropical America.

2. *Clidemia strigillosa* (Sw.) DC. Prodr. 3: 159. 1828.

Melastoma strigillosa Sw. Prodr. 71. 1788.

Staphidium spicatum Naud. Ann. Sci. Nat. III. 17: 316. 1852.

Clidemia spicata strigillosa Griseb. Fl. Br. W. I. 247. 1860.

A shrub, about 1 m. high or less, the twigs, petioles, inflorescence and calyx densely glandular-pubescent. Leaves ovate to ovate-elliptic, membranous, 5–12 cm. long, denticulate, 7-nerved from the base, with the transverse venation rather prominent, dark green and setulose above, pale green, reticulated and hirsute beneath, the apex acuminate, the base rounded or subcordate, the petioles 1–2 cm. long; panicles peduncled, mostly many-flowered and shorter than the leaves; flowers 5–6-parted, subsessile; calyx-tube about 5 mm. long, the inner teeth 2–3 mm., the outer 5–7 mm. long; petals white, about 5 mm. long; fruit subglobose, black, 6–7 mm. in diameter. [*C. lima* of Bello, not of de Candolle; *C. neglecta* of Stahl, not of Don.]

Banks and thickets in moist parts of the central and western districts of Porto Rico, ascending to high elevations:—Jamaica; Cuba; Hispaniola; Guiana and Peru.

3. *Clidemia polystachya* (Naud.) Cogn. in DC. Mon. Phan. 7: 1021. 1891.

Staphidiastrum polystachyum Naud. Ann. Sci. Nat. III. 17: 327. 1852.

Sagraea polystachya Triana, Trans. Linn. Soc. 27: 138. 1871.

Branches densely and softly hirsute. Leaves narrowly ovate, minutely crenulate, 12–18 cm. long, 6–10 cm. wide, densely long-hirsute on both sides, 5-nerved from the base; panicles up to 10 cm. long, geminate, many-flowered, their branches verticillate, slender, elongated, the 4-parted flowers subsessile; calyx-tube campanulate, hirsute, 2 mm. long, the outer teeth 0.5 mm. long; petals 1.5 mm. long; fruit globose, very small.

Porto Rico, collected only by Plée, and known to us from descriptions only. Endemic.

4. *Clidemia domingensis* (DC.) Cogn. Jahrb. Bot. Gart. Berlin 4: 283. 1886.

Sagraea domingensis DC. Prodr. 3: 171. 1828.

A shrub, 1–3 m. high, the twigs hirtellous. Leaves narrowly ovate, or oblong-ovate, membranous, 10–17 cm. long, denticulate, 5-nerved, sparsely short-hirsute on both sides, the apex acute or short-acuminate, the base rounded, the petioles 3–7 cm. long; panicles slender, diffuse, few-flowered, 10 cm. long or less; flowers 4-parted; calyx-tube hirtellous, about 2 mm. long, the outer teeth 0.5 mm. long; petals white, about 1 mm. long; berry black or blue, subglobose, 2–3 mm. in diameter.

Woodlands near Bayamon, in the Yabucoa Mountains and on Mt. Piedra Azul at Jácana:—Hispaniola; St. Vincent.

Clidemia umbrosa (Sw.) Cogn. was recorded by Cogniaux as found at Mayaguez by Krug, after a study of a leaf only, noting that the determination was uncertain. Nothing more is known about the species in Porto Rico; it ranges from St. Kitts to St. Lucia.

Clidemia spicata DC., recorded by Cogniaux as collected on St. Thomas by Finlay, was really from Trinidad. Eggers erroneously records it as found on all three of the former Danish Islands.

Clidemia rubra Mart., attributed by Naudin to St. Thomas as collected by Finlay, was really from Trinidad.

Clidemia attenuata (Naud.) Cogn., recorded by authors as from St. Thomas, collected by Finlay, was also from Trinidad. [*Sagraea attenuata* Naud.]

12. **HENRIETELLA** Naudin, Ann. Sci. Nat. III. 18: 107. 1852.

Shrubs or trees, with petioled, 3–5-nerved, mostly entire leaves and small 4–5-parted flowers in fascicles borne on the twigs below the leaves. Calyx campanulate to hemispheric, its limb truncate or 4–5-toothed. Petals acute or acuminate. Stamens usually 10; filaments filiform; anthers oblong, obtuse, 1-porose, the connective not appendaged. Ovary 4–5-celled; style filiform. Fruit a many-seeded berry. [Diminutive of *Henriettea*, a related genus.] About 25 species, natives of tropical America. Type species: *Henrietella Seemannii* Naudin.

Calyx-limb truncate; foliage glabrous; leaves 3-nerved.

Calyx-limb obtusely dentate; leaves pubescent, 5-nerved.

Leaves rounded at base; flowers nearly sessile.

Leaves narrowed at base; flowers pedicelled.

1. *H. MacFadyenii*.

2. *H. membranifolia*.

3. *H. fascicularis*.

1. **Henrietella MacFadyenii** Triana, Trans. Linn. Soc. 27: 143. 1871.

A tree, up to 20 m. high, nearly glabrous throughout, the young foliage somewhat scurfy, the slender young twigs angular. Leaves oblong, submembranous, 3-nerved above the base, 5–12 cm. long, bright green above, light green beneath, the transverse venation delicate, the apex short-acuminate, the base narrowed, the petioles 1–2 cm. long; fascicles few-flowered; pedicels filiform, 5–10 mm. long; calyx subhemispheric, about 3 mm. long, its slightly dilated limb truncate; fruit subglobose, about 4 mm. in diameter.

Forests on Mt. Jimenes in the Luquillo Mountains and at Viva Cristo, between Adjuntas and Guayanilla:—Jamaica. The petals of this species are unknown.

2. **Henrietella membranifolia** Cogn. in DC. Mon. Phan. 7: 1042. 1891.

A shrub, or a tree up to about 10 m. high, the slender twigs terete, hirsute. Leaves ovate, membranous, long-petioled, 1–2 dm. long, 5-nerved from above the base, ciliate, the apex acute, the base rounded, the petioles 3.5 cm. long or shorter; flowers small, 4-parted, nearly sessile in the fascicles; calyx ovoid-campanulate, 2 mm. long, 4-denticulate; petals white, triangular-lanceolate, long-acuminate, 2–3 mm. long.

Woodlands near Lares and Aguada. Endemic. Collected only by Sintenis.

3. *Henrietella fascicularis* (Sw.) C. Wright; Sauvalle, *Anales Acad. Habana* 5: 435. 1869.

Melastoma fascicularis Sw. Prodr. 71. 1788.

Sagraea fascicularis DC. Prodr. 3: 170. 1828.

Sagraea acutiflora Naud. Ann. Sci. Nat. III. 18: 99. 1852.

Ossaea fascicularis Griseb. Fl. Br. W. I. 246. 1860.

A tree, 6–15 m. high, or sometimes shrubby, the young twigs and petioles densely hirsute. Leaves elliptic or oblong-elliptic, membranous, 5-nerved above the base with the transverse venation slender, green on both sides but paler beneath than above, short-hirsute on both sides, especially on the veins beneath, the apex acute, the base narrowed, the petioles 1.5 cm. long or shorter; fascicles few-several-flowered; pedicels 2–6 mm. long; calyx campanulate, about 3 mm. long, obscurely 4-denticulate; petals white, about 4 mm. long, triangular-lanceolate, long-acuminate; berry black, globose, about 6 mm. in diameter.

Woodlands and forests in moist or wet districts of Porto Rico, ascending to high elevations:—Jamaica; Cuba; Hispaniola.

13. *OSSAEA* DC. Prodr. 3: 168. 1828.

Shrubs, mostly with pubescent or scabrous foliage, the leaves 3–7-nerved, the small 4–6-parted flowers in axillary clusters. Calyx campanulate to oblong, its limb truncate or dentate, the outer teeth often subulate. Petals lanceolate or subulate, acuminate, often coherent. Stamens twice as many as the petals; filaments filiform. Ovary 3–5-celled; style filiform, glabrous. Fruit a many-seeded, small berry. [Commemorates José Antonio de la Ossa, Spanish botanist.] About 50 species, natives of tropical America. Type species: *Ossaea scalpta* (Vent.) DC.

Flowers 5–6-parted, red.

Flowers 4-parted, white.

Leaves ovate, 7-nerved.

Leaves oblong-lanceolate, 3-nerved.

1. *O. Krugiana*.

2. *O. scabrosa*.

3. *O. domingensis*.

1. *Ossaea Krugiana* Cogn. in DC. Mon. Phan. 7: 1048. 1891.

A shrub, about 3 m. high, the slender twigs, the petioles and inflorescence densely strigose with thick scale-like hairs. Leaves ovate, membranous, 4–10 cm. long, serrulate, green on both sides but paler beneath than above, 5-nerved with the transverse venation delicate, the apex acuminate, the base rounded, the petioles 1–3 cm. long, the upper surface conic-pustulate, the under side strigose on the veins; flowers 5–6-parted, nearly sessile, in small, short-peduncled cymes; calyx-tube ovoid, about 3 mm. long, its narrow teeth 1–1.5 mm. long; petals red, acute, triangular-ovate, about 3 mm. long.

Primeval forests near Adjuntas. Endemic. The fruit of this species is unknown.

2. *Ossaea scabrosa* (L.) DC. Prodr. 3: 169. 1828.

Melastoma scabrosa L. Syst. ed. 10, 1022. 1759.

Clidemia scabrosa Griseb. Fl. Br. W. I. 248. 1860.

A shrub, up to about 4 m. high, the twigs and petioles densely plumose-strigose. Leaves ovate, submembranous, 5–12 cm. long, denticulate, about 7-nerved with the transverse venation delicate, dark green and sparsely tuberculate above, pale green and hirtellous beneath, the apex bluntly acute, the base rounded or obtuse, the rather stout petioles 1–7 cm. long; flowers in small axillary glomerules; calyx-tube campanulate, hirsute, about 2 mm. long, its triangular-subulate teeth

about 1 mm. long; petals acuminate, white, about 2 mm. long; berry small, bluish.

Primeval forest near Utuado, collected only by Sittenis:—Jamaica; Cuba.

3. *Oreocaea domingensis* Cogn. in Urban, Symb. Ant. 7: 530. 1913.

A slender shrub, the terete twigs and the petioles densely stellate-scurfy. Leaves oblong or oblong-lanceolate, membranous, 6–11 cm. long, nearly 3 times as long as wide, 3-nerved, entire, dark green and sparsely setulose above, light green and stellulate-puberulent beneath at least on the veins, the apex acute or acutish, the base narrowed or obtuse, the petioles 1–2.5 cm. long; flowers in small axillary clusters, 4-parted, the calyx about 1.5 mm. long, puberulent, its subulate teeth 1 mm. long or shorter; berry about 2 mm. in diameter.

Alto de la Bandera, Porto Rico (*Sterens* 8717):—Hispaniola.

14. *MOURIRI* Aubl. Pl. Gulan 1: 452. 1775.

Glabrous shrubs or trees, with entire, short-petioled or sessile, coriaceous, faintly pinnately veined or veinless leaves but the midnerve prominent, the mostly small and 5-parted flowers fascicled or solitary at the nodes of twigs, or in the axils. Calyx-tube turbinate to hemispheric, smooth or in some species scurfy, the limb cup-like, lobed or subtruncate. Petals acute or acuminate. Stamens twice as many as the petals, the filaments filiform, the anthers 2-rimose. Ovary 1–5-celled; style slender; stigma small; ovules 2—several in each cavity. Fruit a drupe-like, 1–4-seeded berry. [Gulana name.] About 40 species, of tropical America. Type species: *Mouriri guianensis* Aubl.

Leaves ovate to ovate-lanceolate, acuminate, 5–8 cm. long.
Leaves obovate to oval, obtuse, 2–3 cm. long.

1. *M. domingensis*.
2. *M. Helleri*.

1. *Mouriri domingensis* (Tuss.) Spach, Hist. Nat. Veg. 4: 276. 1835.

Petaloma domingensis Tuss. Fl. Ant. 3: 119. 1824.

Aulacocarpus quadrangularis Griseb. Fl. Br. W. I. 239. 1860.

Eugenia tetrazperma Bello, Anal. Soc. Esp. Hist. Nat. 10: 271. 1881.

A tree, reaching a maximum height of about 10 m., with slender, somewhat 4-angled twigs. Leaves ovate, slightly fleshy, 4–9 cm. long, shining above, faintly few-veined, the apex acute or short-acuminate, the base obtuse or somewhat narrowed, the petioles 3–5 mm. long; flowers fascicled; pedicels 6 mm. long or less; calyx-tube turbinate, about 3 mm. long, its lobes short and broad; petals oblong, rose, acute, 4 mm. long; fruit subglobose, yellow or orange, about 15 mm. in diameter. [*Petaloma Mouriri* of West.]

Woodlands and thickets at lower and middle altitudes, Porto Rico; Vieques; St. Croix:—Hispaniola; Antigua; Guadeloupe. Sometimes cultivated. CAMITILLO, GUA-SAVARA. MURTA.

2. *Mouriri Helleri* Britton, Torreya 2: 10. 1902.

A spreading shrub, 2–3 m. high, much branched, the slender young twigs quadrangular. Leaves obovate to oval or oval-obovate, 2–3 cm. long, bluish green, shining, coriaceous, very obscurely veined, the apex rounded or obtuse, the base narrowed, the margins slightly revolute, the petioles about 1 mm. long, flowers solitary in the upper axils; pedicels 5–6 mm. long, 2-bracteolate at about the middle; fruit orange, 10 mm. in diameter or larger, the persistent calyx-limb with short broad acute lobes. [*M. domingensis* of Bello, not of Spach.]

Sandy and rocky soil, near Cataño, Hatillo and Guanica. Endemic. MAMEYUELO.

Mouriri guianensis Aubl., a related species, of Trinidad and northern South America, was recorded by Krebs in 1852, as found in St. Thomas; it may have been planted there.

Tibouchina (?) **diffusa** (Pav.) Cogn., described as from Porto Rico by D. Don, has not been identified with any known species by modern botanists. [*Melastoma diffusa* Pav.; D. Don, Mem. Wern. Soc. 4: 291. 1823. *Pleroma* (?) *diffusa* DC.]

Charianthus nodosus (Desr.) Triana, of the Lesser Antilles from St. Kitts southward, was recorded by Krebs as found in St. Thomas, presumably in error. [*Melastoma nodosa* Desr.]

Conostegia procera (Sw.) D. Don, a species endemic in Jamaica, was erroneously recorded by Krebs from St. Thomas; there is a parish of St. Thomas in Jamaica.

Family 2. LYTHRACEAE Lindl.

LOOSESTRIFE FAMILY.

Herbs, shrubs, or often trees in tropical regions, mostly with opposite leaves and perfect flowers. Stipules usually none. Calyx persistent, free from the ovary, the limb toothed. Petals as many as the primary calyx-teeth; inserted on the calyx, or none. Stamens inserted on the calyx; anthers versatile. Ovary 2-6-celled or sometimes 1-celled; style 1; ovules ∞ , rarely few, anatropous. Capsule 1-several-celled. Seeds without endosperm; cotyledons flat, often auricled at the base. About 21 genera and 400 species of wide distribution.

Calyx-tube short, globose to turbinate.

Herbaceous plants.

Capsule septicidally dehiscent.

Capsule bursting irregularly.

Shrubs or small trees.

Stamens 10-20; capsule dehiscent; native tree.

Stamens 8; capsule indehiscent or irregularly bursting; introduced.

Calyx-tube tubular; flowers irregular.

1. *Rotala*.

2. *Ammannia*.

3. *Ginoria*.

4. *Lawsonia*.

5. *Parsonsia*.

1. **ROOTALA** L. Mant. 143, 175. 1771.

Low annual mainly glabrous herbs, usually with opposite leaves, 4-angled stems, and axillary, mainly solitary, small flowers. Calyx campanulate or globose, 4-lobed. Stamens 4, short. Ovary free from the calyx, globose, 4-celled. Capsule subglobose, 4-celled, the valves minutely and densely striate transversely. [Latin, wheel, from the whorled leaves of some species.] About 30 species, of wide distribution. Type species: *Rotala verticillata* L.

1. **Rotala ramosior** (L.) Koehne, in Mart. Fl. Bras. 13²: 194. 1877.

Ammannia ramosior L. Sp. Pl. 120. 1753.

Ammannia humilis Michx. Fl. Bor. Am. 1: 99. 1803.

Peplis occidentalis Spreng. Syst. 2: 135. 1825.

Ammannia occidentalis DC. Prodr. 3: 78. 1828.

Glabrous, 5-25 cm. high. Leaves oblong or linear-oblong, 1-3 cm. long, blunt at the apex, narrowed and sessile at the base or tapering into a short petiole,

not auricled; flowers solitary or rarely 3 in the axils, very small; petals minute; style almost none; capsule about 3 mm. long.

Wet or moist open grounds, Porto Rico, at lower and middle elevations:—Hispaniola; Guadeloupe; Martinique; Trinidad; Margarita; continental temperate and tropical America; Philippine Islands. YERBA DE CANCER.

2. **AMMANNIA** [Houst.] L. Sp. Pl. 119. 1753.

Annual glabrous or glabrate herbs, mostly with 4-angled stems, opposite sessile narrow leaves, and small axillary flowers. Calyx campanulate, globose or ovoid, 4-angled, 4-toothed, often with small accessory teeth in the sinuses. Petals 4, deciduous, or none. Stamens 4–8, inserted on the calyx-tube. Ovary nearly globular, 2–4-celled. Capsule bursting irregularly. [Named for Johann Ammann, 1699–1741, a German botanist.] About 20 species, of wide distribution, known as CRAB-WEED and YERBA DE CANCER. Type species: *Ammannia latifolia* L.

Style very short.

Style filiform, usually more than half as long as the capsule.

1. *A. latifolia*.

2. *A. coccinea*.

1. **Ammannia latifolia** L. Sp. Pl. 119. 1753.

Erect, 2–11 dm. high, the branches nearly erect, or ascending. Leaves linear-lanceolate or linear-oblong, 2–7 cm. long, 2–10 cm. wide, acute or blunt at the apex, sessile, clasping the stem by an auricled base; flowers minute, green, sessile and solitary or few together in the axils; calyx about 2 mm. long; petals none; style short; capsule about 4 mm. in diameter, enclosed by the calyx.

Marshes, ditches, borders of lakes and in cultivated ground, Porto Rico, at lower elevations; St. Croix; St. Thomas; Tortola:—Florida; West Indies; continental tropical America.

2. **Ammannia coccinea** Rottb. Pl. Hort. Havn. Descr. 7. 1773.

Ammannia sanguinolenta Sw. Fl. Ind. Occ. 272. 1797.

Erect, 1.5–5 dm. high. Leaves obtusely cordate-auriculate and dilated at the somewhat clasping base, entire, 2–8 cm. long, 2–6 mm. wide; flowers 1–5 in each axil, sessile or nearly so; petals purple, fugacious; style very slender; capsule 3–4 mm. in diameter, enclosed by the calyx.

Marshes, ditches and borders of lakes, Porto Rico, at lower elevations; St. Croix; St. Thomas; St. Jan.:—Jamaica; Cuba; Hispaniola; Martinique; Curaçao; temperate and tropical continental America; Pacific and Philippine Islands.

3. **GINORIA** Jacq. Enum. 5, 22. 1760.

Shrubs or small trees, prickly or unarmed, with opposite entire leaves, and large or small, solitary or clustered, often showy, axillary pedicelled flowers. Calyx hemispheric to turbinate, 4–6-lobed. Petals 4–6, broad, erose. Stamens 10–20, borne on the calyx-tube; filaments filiform; anthers oblong. Ovary subglobose; style slender; stigma capitate. Fruit a loculicidally dehiscent capsule. Seeds many, small. [Commemorates Carlo Ginori, Italian botanist.] About 10 species, natives of the West Indies. Type species: *Ginoria americana* Jacq.

1. **Ginoria Rohrii** (Vahl) Koehne, Bot. Jahrb. 3: 351. 1882.

Antherylium Rohrii Vahl, Skr. Nat. Selsk. 2: 211. 1792.

A shrub, or small tree about 5 m. high, the branches nearly erect, glabrous throughout, the twigs sharply 4-angled, bearing 2–4 short decurrent prickles at

the nodes. Leaves ovate to elliptic or elliptic-obovate, membranous when young, chartaceous when old, 3–8.5 cm. long, strongly pinnately veined, green on both sides, the apex acute, obtuse or rounded, the base mostly narrowed, the petioles 3 mm. long or shorter; flowers in sessile axillary or lateral umbels or sometimes solitary; pedicels filiform, 2–13 mm. long; calyx about 6 mm. long, its lobes much longer than the tube; petals obovate, white, 6–9 mm. long; style filiform; capsule globose-ovoid, about as long as the calyx.

Thickets, hillsides and plains along and near the eastern and southern coasts and about Lake Guanica, Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Hispaniola; recorded from St. Vincent. Sometimes occurs within saline influence. UCARILLO. ROSA DE CIENEGA. BASTARD GREGE.

4. **LAWSONIA** L. Sp. Pl. 349. 1753.

A glabrous shrub, the slender branches unarmed or spinescent, the small opposite leaves entire, the small fragrant flowers paniculate. Calyx-tube turbinate, 4-angled, much shorter than the 4 ovate spreading lobes. Petals 4, sessile, erose. Stamens 8, borne at the base of the calyx-tube; filaments subulate; anthers oblong. Ovary globose, 4-celled; style filiform; stigma capitate. Capsule globose, at length irregularly bursting. [Commemorates John Lawson, English physician and naturalist.] A monotypic genus.

1. **Lawsonia inermis** L. Sp. Pl. 349. 1753.

A densely much-branched shrub, 2 m. high or higher, the twigs terete. Leaves oblong, or some of them obovate, thin, dark green, 2–5 cm. long, delicately pinnately veined, the apex acute, the base narrowed, the petioles 1–2 mm. long; panicles subcorymbose, longer than the leaves, commonly many-flowered; pedicels filiform, 3–6 mm. long; flowers white, about 8 mm. broad; stamens rather longer than the petals; capsule 5–7 mm. in diameter.

Spontaneous after cultivation in Porto Rico; St. Croix; St. Thomas:—widely planted for ornament and spontaneous in the West Indies. Native of the Old World tropics. RESEDA. EGYPTIAN PRIVET. HENNA PLANT. MIGNONETTE-TREE.

5. **PARSONSIA** P. Br.; Adans. Fam. Pl. 2: 234. 1763.

Herbs (some shrubs in tropical regions), with opposite or verticillate leaves. Flowers axillary, irregular and unsymmetrical. Calyx-tube elongated, 12-ribbed, gibbous or spurred at the base, oblique at the mouth, with 6 primary teeth and usually as many accessory ones. Petals 6, unequal. Stamens 6–11, inserted on the throat of the calyx, unequal; filaments short. Ovary with a curved gland at its base, unequally 2-celled; style slender; stigma 2-lobed. Capsule oblong, 1-celled, laterally dehiscent. Seeds flattened. [In honor of James Parsons, M.D., a Scotch botanist.] About 180 species, natives of America, those of Porto Rico called CHIAGARI. Type species: *Lythrum Parsonsia* L.

Pubescence short, rough; plant diffuse.

Pubescence long, often viscid; plant erect.

1. *P. Parsonsia*.

2. *P. micrantha*.

1. **Parsonsia** *Parsonsia* (L.) Britton; Northrop, Mem. Torr. Club 12: 53. 1902.

Lythrum Parsonsia L. Syst. ed. 10, 1045. 1759.

Parsonsia herbacea J. St. Hil. Exp. Fam. Nat. 2: 173. 1805.

Cuphea Parsonsia R. Br.; Steud. Nom. 1: 245. 1821.

Parsonsia radicans Hitchc. Rep. Mo. Bot. Gard. 4: 87. 1893.

Lythrum repens Sessé & Moc. Fl. Mex. ed. 2, 121. 1894.

Annual; stem little-branched, the branches prostrate or ascending, 1–3 dm. long, rough-pubescent. Leaves ovate or oblong, 1–2 cm. long, very short-

petioled, acute or obtuse at the apex, mostly narrowed at the base, scabrous or nearly smooth; flowers solitary in upper axils, short-peduncled; calyx about 4 mm. long, gibbous at the base, its teeth very small; petals pale purple, about 2 mm. long; stamens mostly 6, included; filaments glabrous; capsule about 5 mm. long, few-seeded.

Sandy and rocky soil, and in cultivated grounds at lower and middle elevations in wet or moist districts of Porto Rico:—Bahamas; Cuba; Hispaniola; Martinique; Mexico.

2. *Parsonsia micrantha* (H.B.K.) Jennings, Ann. Carnegie Mus. 11: 198. 1917.

Cuphea micrantha H.B.K. Nov. Gen. 6: 196. 1823.

Melanium hirtum Spreng. Syst. 2: 454. 1825.

Annual; stem erect, slender, simple or branched, pubescent and glandular-hirsute, 1–4.5 dm. high. Leaves lanceolate to oblong-lanceolate, nearly sessile, thin, loosely hirsute, 1.5–6.5 cm. long, the apex acute or acuminate, the base narrowed, rounded or subcordate; flowers solitary or few in the upper axils, the peduncles 1–3 mm. long; calyx 4–7 mm. long, slightly gibbous, the teeth short; stamens 11.

Wet sand near Dorado, Porto Rico, collected only by Stahl; we failed to find it in that vicinity in 1922 and 1923:—Cuba; Hispaniola; continental tropical America.

Parsonsia platycentra (Lemaire) Britton, Mexican, occasionally grown in Porto Rico flower gardens, is a low shrub, 3–5 dm. high, with oblong thin puberulent acuminate petioled leaves 2–4 cm. long, slender-peduncled flowers 2–3 cm. long, the nearly cylindric calyx scarlet with a white 6-toothed mouth; there are no petals. [*Cuphea platycentra* Lemaire.]

Lagerstroemia indica L., ASTROMEDA, ASTROMERA, GRAPE MYRTLE, QUEEN OF SHRUBS, Asiatic, much planted for ornament in Porto Rico and the Virgin Islands, perhaps sometimes subsontaneous after cultivation, is a tall shrub or small tree, with rather small, entire, mostly opposite leaves, the showy pink or white flowers in terminal panicles, with 6-clawed and crisped petals and many long unequal filaments, the fruit a leathery capsule about 1 cm. in diameter.

Lagerstroemia speciosa (L.) Pers., QUEEN OF FLOWERS, East Indian, occasionally planted for ornament in Porto Rico and the Virgin Islands, is a tree, becoming under favorable conditions 10 m. high or higher; the elliptic leaves are pinnately veined, 8–10 cm. long, the elegant rose to purple flowers 5–8 cm. broad, in panicles 2–3 dm. long, the fruit a capsule 3–5 cm. long. [*Munchausia speciosa* L.; *Lagerstroemia Flos-reginae* Retz.]

Family 3. PUNICACEAE Horan.

POMEGRANATE FAMILY.

Shrubs or small trees, with terete branches. Leaves opposite or nearly so, entire. Flowers perfect, showy, solitary or clustered in the axils, short-peduncled. Calyx leathery, turbinate, adnate to the ovary, its lobes 5–7. Corolla of 5–7 petals inserted at the throat of the calyx-tube, wrinkled. Stamens numerous in many series on the calyx-tube; filaments filiform; anthers versatile. Ovary several-celled, inferior; styles united; stigma slightly lobed. Ovules numerous, superimposed in 2 series. Fruit a several-celled berry crowned with the calyx, with a leathery coat, its septa membranous. Seeds angled, in a watery pulp, with a leathery testa. Embryo with spirally convolute cotyledons, each auricled at the base. Only the following genus containing the one typical species and perhaps one other.

1. **PUNICA** L. Sp. Pl. 472. 1753.

Characters of the family. [Latin, from the Roman name for Carthage, where the fruit was obtained.]

1. **Punica Granatum** L. Sp. Pl. 472. 1753.

Punica nana L. Sp. Pl. ed. 2, 676. 1763.

A shrub, or tree reaching a height of 7 m. Foliage glabrous; leaves leathery, oval, elliptic or oblong, varying to broadest slightly above or below the middle, 1–8 cm. long, obtuse or acute, or rarely retuse, flat, short-petioled; peduncles stout, 1–several-flowered; calyx-tube turbinate, becoming campanulate, later subglobose, its lobes triangular or triangular-lanceolate, much shorter than the tube, acute, finally deciduous; petals scarlet or white, their blades suborbiculate or orbiculate-obovate, 2.5 cm. long or less, short-clawed; fruit subglobose, 6–14 cm. in diameter.

Occasionally spontaneous after planting for its fruit in Porto Rico: St. Croix; St. Thomas; St. Jan:—widely planted in tropical and subtropical regions. Native of the Mediterranean region. The dwarf, small-leaved and small-flowered race was seen growing well in Mrs. McKinley's garden near San Juan in 1924. GRANADA. POMEGRANATE.

Family 4. **TERMINALIACEAE** J. St. Hil.

WHITE MANGROVE FAMILY.

Trees, shrubs, or vines, with petioled, usually simple and entire, estipulate leaves, and regular, perfect or rarely polygamo-dioecious flowers, mostly spicate, racemose or capitate. Tube of the calyx adnate to the ovary, the limb 4–8-cleft. Petals usually small or none. Stamens various; filaments filiform; anthers didymous or 2-celled, the sacs dehiscent longitudinally or by valves. Ovary 1-celled; ovules 1–several; style usually straight; stigma simple. Fruit various, mostly indehiscent, coriaceous or baccate. About 15 genera and some 275 species, mostly tropical.

Petals wanting.

Calyx deciduous.

Flowers in axillary spikes; fruit drupaceous.

Fruit ellipsoid, compressed.

Fruit oblong, subterete.

Flowers in globose heads; fruit scale-like.

Calyx persistent.

Petals present; calyx persistent.

1. *Terminalia*.

2. *Buchenavia*.

3. *Conocarpus*.

4. *Bucida*.

5. *Laguncularia*.

1. **TERMINALIA** L. Mant. 1: 21, 128. 1767.

Trees or shrubs, with broad alternate entire leaves, usually clustered at the ends of the branches, and small spicate flowers. Calyx-tube terete, ribless, the lobes deciduous. Petals none. Stamens 10 to 20, exserted, the filaments slender, the anthers cordate. Fruit a flattened drupe. [Latin, referring to the clustered leaves at the ends of the branches.] About 100 species, mostly of the Old World tropics. Type species: *Terminalia Catappa* L.

1. **Terminalia Catappa** L. Mant. 1: 128. 1767.

Buceras Catappa Hitchc. Rep. Mo. Bot. Gard. 4: 85. 1893.

A tree, up to 24 m. high, with a trunk diameter of 1.5 m., usually much smaller, the spreading branches whorled, the twigs stout, glabrous, the bark

shallowly fissured. Leaves clustered at the ends of the twigs, obovate or broadly oblanceolate, 1–3 dm. long, short-petioled, glabrous, rounded or short-pointed at the apex, cuneate at the base, dark green and shining above, pale green beneath; spikes slender, many-flowered, 5–15 cm. long; calyx 8–10 mm. long, pubescent, its ovate lobes about as long as the tube or longer; drupe ellipsoid, compressed, glabrous, 2-edged, pointed, 4–7 cm. long; seed 3–4 cm. long.

Hillsides and sand dunes, Porto Rico, mostly near or along the coasts; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda; much planted for shade:—Florida; West Indies; continental tropical America and Old World tropics. Native of Malaya. The brownish hard and strong wood, used for furniture and in construction, has a specific gravity of about 0.7. The ripe seeds are eaten, like almonds; the green fruits are highly astringent and may be used in tanning. ALMENDRON. INDIAN ALMOND. MALABAR ALMOND.

2. **BUCHENAVIA** Eichl. Flora 49: 164. 1866.

Trees or shrubs, with alternate entire leaves, mostly clustered at the ends of the twigs, the small flowers capitate or spicate. Calyx terete, 5-toothed, the teeth deciduous. Petals none. Stamens 10, scarcely exerted, in 2 series; filaments cylindric; anthers subdidymous. Fruit an oblong or ovoid drupe. [Named in honor of Franz Buchenau, German botanist, 1831–1906.] About 8 species, the following typical one widely distributed in tropical America, the others mostly Brazilian.

1. **Buchenavia capitata** (Vahl) Eichl. Flora 49: 165. 1866.

Bucida capitata Vahl, Eclog. 1: 50. 1796.

Pseudolmedia bucidaefolia Bello, Anal. Soc. Esp. Hist. Nat. 12: 109. 1883.

A large tree, up to 25 m. high or higher, with a trunk 6–15 dm. in diameter, the young twigs pubescent, the brown bark slightly fissured. Leaves obovate to spatulate, subcoriaceous, 3–7 cm. long, reticulate-veined, dark green, nearly glabrous and shining above, light green beneath and appressed-pubescent on the veins, the apex rounded or obtuse, the base cuneate, the petioles 3–8 mm. long, pubescent; peduncles pubescent, 1–3 cm. long; spikes subglobose or oblong, 10–18 mm. long; flowers green, very small; drupe oblong, 1.5–2.5 cm. long.

Woodlands and forests in wet or moist districts, Porto Rico, mostly at middle and higher elevations; Tortola:—Jamaica; Cuba; Hispaniola; Montserrat to St. Vincent; continental tropical America. The wood is satiny, hard, strong and heavy, valued for furniture and in construction. GRANADILLO.

3. **CONOCARPUS** L. Sp. Pl. 176. 1753.

A shrub or tree of the seacoast, with alternate entire leathery leaves, the petioles 2-glandular, the small greenish perfect flowers in racemed or panicked heads. Calyx-tube flattened, not prolonged beyond the ovary; sepals 5, deciduous. Petals none. Stamens mostly 5, with slender elongated filaments and cordate anthers. Style pubescent. Ovules 2. Drupes scale-like, densely aggregated. Seeds flat; cotyledons convolute. [Greek, referring to the cone-like heads of fruit.] A monotypic American genus.

1. **Conocarpus erecta** L. Sp. Pl. 176. 1753.

A glabrate or silky-pubescent shrub or tree, sometimes 20 m. tall, sometimes less than 1 m. high, with angled or winged twigs, the bark astringent. Leaves 2–5 cm. long, elliptic to oval or acuminate at both ends, entire, short-petioled; racemes 3–5 cm. long, peduncled; heads 5–8 mm. in diameter at flowering time; calyx-tube funnel-like, greenish, a little over 1 mm. long; its lobes triangular,

about as long as the limb of the calyx, pubescent; stamens and style conspicuously exserted; heads of fruit 9–14 mm. long; drupes 2-winged, 4–7 mm. long.

Coastal rocks and mangrove swamps, Porto Rico; Mona; Icacos; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda; Anegada:—Florida; Bermuda; West Indies; continental tropical America; western tropical Africa. The wood is brownish, hard, strong and very heavy, its specific gravity barely 1.00. MANGLE BOTON. BUTTONWOOD. BUTTON-TREE.

4. **BUCIDA** L. Syst. ed. 10, 1025. 1759.

Trees or shrubs, sometimes spinescent, with coriaceous entire alternate leaves clustered at the end of the twigs, and small spicate or capitate flowers, some perfect, some staminate. Calyx broadly campanulate, slightly 5-toothed, persistent. Petals none. Stamens 10, in 2 series; filaments slender, exserted. Fruit a small, slightly fleshy drupe, crowned by the at length deciduous calyx. [Latin; slender horn-like galls develop from the fruit after it is bitten by a mite.] Two species, natives of the West Indian region. Type species: *Bucida Buceras* L.

1. **Bucida Buceras** L. Syst. ed. 10, 1025. 1759.

A tree, attaining a maximum height of about 25 m., the trunk up to 1 m. in diameter or more, the young twigs and leaves pubescent, becoming glabrous, the old bark grey, separating into oblong scales. Leaves clustered at the ends of twigs, spatulate to elliptic, 3–9 cm. long, obtuse or emarginate at the apex, narrowed at the base, short-petioled; spikes peduncled, slender, pubescent, 3–10 cm. long; calyx-lobes triangular, acute; stamens exserted; drupe ovoid-conic, about 8 mm. long, tomentulose, slightly curved.

Plains, hillsides, river banks and coastal woods, at lower elevations, Porto Rico; Mona; Vieques; St. Croix; St. Thomas; St. Jan:—Florida; West Indies; Panama. The light brown or nearly white wood is used for shingles, cogs, in carpentry and for boats; it is durable, hard, heavy, strong and tough, with specific gravity about 1.04. A resin exudes from cut trunks; the astringent bark has been used in tanning. BUCARO. BLACK OLIVE. WATER GREGE. GREGORY WOOD.

5. **LAGUNCULARIA** Gaertn. f. Fr. & Sem. 3: 209. 1805.

A halophytic tree or shrub, with opposite entire leaves, the petioles 2-glandular, and small greenish flowers in clustered spikes. Flowers polygamous or perfect. Calyx-tube terete, 5-lobed. Petals 5, minute. Stamens 10, short, the filaments subulate, the anthers cordate. Ovary with a scalloped epigynous disk; style short, glabrous; stigma somewhat 2-lobed; ovules 2 in each cavity. Drupes coriaceous, ribbed or angled. Seed solitary, germinating within the drupe. [Latin, from the fancied resemblance of the drupe to a flask.] A monotypic genus.

1. **Laguncularia racemosa** (L.) Gaertn. f. Fr. & Sem. 3: 209. 1805.

Conocarpus racemosa L. Syst. ed. 10, 930. 1759.

A tree, reaching a maximum height of about 20 m. with a trunk up to 8 dm. in diameter, usually much smaller, and often shrubby, the reddish brown, glabrous twigs thickened at the nodes. Leaves oblong, oval or obovate, 2–7 cm. long, emarginate or rounded at the apex, rounded, narrowed or subcordate at the base, the stout petioles 0.5–2 cm. long; spikes 3–6 cm. long, few-several-flowered; calyx tomentulose, its lobes rounded; petals 5, orbicular, not longer than the calyx; drupes oblong to obovoid, reddish, 1.5–2 cm. long, constricted below the persistent calyx-lobes.

Coastal swamps, Porto Rico; Mona; Vieques; St. Croix; St. Thomas; St. Jan; Anegada:—Florida; West Indies; continental tropical America; west tropical Africa.

Its yellowish brown wood is hard and strong, with specific gravity about 0.86; the bark is astringent. MANGLE BLANCO. WHITE MANGROVE.

Quisqualis indica L., **QUISQUAL**, RANGOON CREEPER, a woody vine of the Old World tropics, is planted for ornament about houses in Porto Rico and the Virgin Islands; it has opposite, elliptic to oblong-lanceolate, entire, acuminate leaves 7–10 cm. long, the flowers numerous and showy in terminal drooping spikes with a very slender calyx-tube 7 or 8 cm. long and 5 white, pink to red oblong-lanceolate petals 1.5–2 cm. long, the leathery capsular fruit 5-angled.

Grislea coccinea (Lam.) Britton, Madagascan, an elegant vine seen in 1923 in a garden at St. Thomas, where it had flourished for many years, becomes at least 6 m. long, slender and with long branches, the opposite oblong-glabrous acute leaves 7–10 cm. long, the small numerous bright red flowers in terminal panicked racemes, the calyx 5-lobed, the petals 5, the 10 exserted stamens about 12 mm. long. [*Combretum coccineum* Lam.].

Family 5. MYRTACEAE R. Br.

MYRTLE FAMILY.

Trees or shrubs, with simple, usually opposite and entire, pellucid-punctate, estipulate leaves, the regular and perfect, often bracteolate flowers mostly paniced. Calyx-tube (hypanthium) adnate to the ovary, the limb usually 4–5-cleft. Petals usually 4 or 5, imbricated, rarely wanting. Disc mostly annular and fleshy. Stamens usually numerous, sometimes only as many as the petals; filaments filiform, distinct, or united at the base; anthers small, 2-celled. Ovary inferior, 2–several, or rarely 1-celled, style simple; stigma terminal, small; ovules usually 2–several in each cavity. Fruit drupaceous or baccate, often crowned by the calyx-limb, or in some genera capsular. Seeds various; endosperm usually wanting. About 60 genera, including over 1700 species, mostly tropical in distribution.

A. Radicle well developed, usually about as long as the cotyledons or longer.

1. Embryo much curved or spiral.

Testa of the seed horny.

Calyx-lobes persistent.

Calyx-limb closed in bud, circumscissile and irregularly separating.

Testa of the seed thin or crustaceous.

2. Embryo straight or somewhat curved.

a. Anther-sacs all alike and equal.

Calyx-limb persistent.

Calyx-lobes 4 or 5, distinct.

Calyx closed in bud, rupturing in anthesis.

Calyx-limb deciduous, cup-like.

b. The two inner anther-sacs higher than the two outer.

B. Radicle very short, much shorter than the thick cotyledons.

Inflorescence centripetal.

Calyx-tube subhemispheric.

Calyx-tube obconic.

Inflorescence centrifugal, cymose.

1. *Psidium*.

2. *Calyptropsidium*.

3. *Amomis*.

4. *Myrcia*.

5. *Plinia*.

6. *Calypttranthes*.

7. *Gomidesia*.

8. *Eugenia*.

9. *Jambos*.

10. *Anamomis*.

1. PSIDIUM L. Sp. Pl. 470. 1753.

Trees or shrubs with pinnately veined leaves and large, axillary or terminal, solitary or clustered flowers. Calyx-tube somewhat prolonged beyond the ovary, its 4 or 5 lobes often united in the bud, irregularly parting at anthesis, persistent. Petals 4 or 5, spreading. Stamens numerous, with filiform filaments in several series. Ovary 4–5-celled; ovules several or many in each cavity. Berry crowned by the calyx-lobes. Seeds several or many, the testa horny. Embryo

curved, with small cotyledons and a long radicle. [Greek, referring to the edible fruit.] A large genus, of which about 100 species have been described. Type species: *Psidium Guajava* L.

Leaves oblong, short-petioled, not cordate, chartaceous.
Leaves suborbicular, subsessile, subcordate, coriaceous.

1. *P. Guajava*.
2. *P. amplexicaule*.

1. ***Psidium Guajava* L. Sp. Pl. 470. 1753.**

Psidium pyriferum L. Sp. Pl. ed. 2, 672. 1762.
Psidium pomiferum L. Sp. Pl. ed. 2, 672. 1762.
Psidium pumilum Vahl, Symb. 2: 56. 1794.
Psidium Guava Griseb. Fl. Br. W. I. 241. 1860.

A shrub, or a small tree, sometimes 7 m. tall, the trunk up to 2 dm. in diameter, with pubescent 4-angled branchlets. Leaves subchartaceous, oblong or nearly so, 4–8 cm. long, acute or obtuse, pubescent beneath, with prominent rib-like nerves, short-petioled; calyx-lobes 1–1.5 cm. long, united in the bud; petals 1.5–2 cm. long; fruit globular or pyriform, yellow, 3–6 cm. in diameter.

Thickets and hillsides at lower and middle elevations, Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan; Tortola;—Florida; Bermuda; West Indies and continental tropical America; widely planted for its fruit in tropical and subtropical regions. The fruit yields the well-known dulce de guayava or guava jelly. The hard brownish, strong and tough wood has a specific gravity of about 0.7, and is used for implements and in carpentry. GUAYAVA.

2. ***Psidium amplexicaule* Pers. Syn. 2: 27. 1807.**

Psidium cordatum Sims, Bot. Mag. pl. 1779. 1816.

A glabrous shrub, 2–4 m. high, the twigs gray, rather stout, subdivaricate. Leaves suborbicular or ovate-orbicular, coriaceous, very nearly sessile, subcordate, 4–7 cm. long, the venation spreading; peduncles terminal and sometimes axillary, solitary or few together, stout, 1 cm. long or less; calyx 6–8 mm. long; ovary 2–4-celled; fruit subglobose, about 2 cm. in diameter.

Hillsides, St. Thomas; St. Jan; Tortola; Virgin Gorda. Recorded as planted on St. Croix and on Guadeloupe. Recorded by Sims from Nevis. SPERRY GUAVA. MOUNTAIN GUAVA.

***Psidium aromaticum* Krebs**, recorded from St. Thomas, is not identified; it is not the same as *P. aromaticum* Aublet.

***Psidium Cattleianum* Sabine**, PURPLE GUAVA, STRAWBERRY GUAVA, Brazilian, occasionally planted in Porto Rico and the Virgin Islands for its fruit, is a small tree with obovate cuneate leaves, its twigs terete, its flowers smaller than those of the Common Guava, its globose purplish fruit about 2.5 cm. in diameter.

A tree, planted at the Agricultural Experiment Station at Mayaguez, about 7 m. high when seen in 1913, called GUAYABOTA, has small oblong-ob lanceolate, short-petioled leaves about 2 cm. long, narrowed at both ends, the filiform axillary peduncles somewhat shorter than the leaves, the globose fruit about 5 mm. in diameter.

2. **CALYPTROPSIDIUM** Berg, Linnaea 27: 349. 1856.

Trees, with opposite, densely punctate leaves and mostly solitary, axillary flowers. Calyx closed in bud, circumscissile and irregularly separating. Petals 5. Stamens many, filiform, in several series. Ovary 5-celled; ovules many. Fruit a many-seeded small berry. Embryo curved, with a long radicle and short

cotyledons. [Greek, capped-*Psidium*.] About 10 species of tropical America. Type species: *Calyptropsidium Friedrichsthalianum* Berg.

1. **Calyptropsidium Sintenisii** Kiaersk. Bot. Tids. 17: 280. 1890.

A small tree, up to about 8 m. high, the foliage glabrous, the twigs slender. Leaves elliptic or oblong-elliptic, 3–6 cm. long, subchartaceous, indistinctly veined, densely punctate, the apex acute, the base narrowed, the slender petioles 6 mm. long or less; flowers solitary, lateral, the slender peduncles 1–2.5 cm. long; calyx-tube about 2 mm. long; fruit subglobose, about 8 mm. long, crowned by the calyx.

High mountain forests in the Sierra de Luquillo. Endemic.

3. **AMOMIS** Berg. Handb. Pharm. Bot. ed. 3, 1: 339. 1855.

Aromatic trees, with large coriaceous punctate pinnately veined leaves, and small 5-parted flowers in axillary many-flowered panicles. Calyx-tube scarcely prolonged beyond the ovary, its spreading lobes persistent. Petals spreading. Stamens many, in several series, with filiform filaments. Ovary 2-celled; ovules about 6 in each cavity; style short; stigma slightly oblique. Seed with a thin crustaceous testa, the embryo spiral, with a long radicle and short cotyledons. [Name, Greek, significance not given.] Three species, of the West Indies and northern South America. Type species: *Myrtus acris* Sw.

Leaves glabrous or nearly so.
Leaves densely whitish-puberulent beneath.

1. *A. carophyllata*.
2. *A. grisea*.

1. **Amomis caryophyllata** (Jacq.) Krug & Urban, Bot. Jahrb. 19: 573. 1895.

Myrtus caryophyllatus Jacq. Obs. 2: 1. 1767.

Myrtus Pimenta Ortega, Hist. Malagueta. 1780.

Myrtus acris Sw. Prodr. 79. 1788.

Myrica acris DC. Prodr. 3: 243. 1828.

Pimenta acris Kostel. Allg. Med. Fl. 4: 1526. 1835.

Pimenta acuminata Bello, Anales Soc. Esp. Hist. Nat. 10: 270. 1881.

A tree, reaching a maximum height of about 15 m., with a trunk up to about 6 dm. in diameter, usually lower, mostly 5–10 m. high, sometimes shrubby, the angular and glandular twigs, the leaves and inflorescence glabrous or nearly so. Leaves elliptic, oblong-elliptic or obovate, 5–15 cm. long, bright green and finely many-veined and reticulated on both sides, the apex rounded, obtuse, emarginate or sometimes acutish, the base narrowed or obtuse, the rather stout petioles 5–15 mm. long; panicles usually ample and many-flowered, longer than the leaves, glandular; calyx-teeth broad, short, acutish; petals rounded, about 4 mm. long; fruit oval to obovoid, 8–10 mm. long, few-seeded. [*P. vulgaris* of Bello, not of Lindley.]

Hillsides and forests in moist districts, Porto Rico, at lower and middle elevations; Vieques; St. Croix (according to Eggers); St. Jan; Tortola:—Cuba; Hispaniola; St. Martin to Trinidad and northern South America. The leaves and twigs yield by distillation the important oil of bay or bay oil; a superior kind of this oil is produced on St. Jan, where there are extensive forests of the tree, obtained for the most part by clearing away other trees and bushes thus permitting the bay trees to grow from seedlings without much cultivation. Much oil is also obtained from wild trees in Porto Rico, but little or none in St. Croix, St. Thomas or Tortola. The species consists of many races differing mainly in the amount and quality of the oil contained, but also in shape, size and color of the leaves and shape of the fruit. Reference is made to an important paper on "The Bay Rum and Bay Oil Industries of St. Thomas and St. Jan" written by Mr. W. C. Fishlock and published in West Indian Bulletin, Vol. 12, No. 4. The dark wood is strong, very hard, tough, mottled and durable, with a specific gravity of about 0.9; it is utilized for rollers, sills, posts and to some extent in carpentry. MALAGUETA. AUSU. GUAYAVITA. BAY RUM TREE. WILD CINNAMON.

2. *Amomis grisea* (Kiaersk.) Britton.

Pimenta acris grisea Kiaersk. Bot. Tids. 17: 289. 1890.

Amomis caryophyllata grisea Krug & Urban, Bot. Jahrb. 19: 575. 1895.

A tree, up to 8 m. high or higher, the young twigs densely puberulent, angular, slender. Leaves elliptic to obovate, coriaceous, similar to those of the preceding species, but pale, whitish and densely puberulent beneath, at least when young; panicles short, often not longer than the leaves, densely puberulent or tomentulose; calyx tomentose, its teeth ovate. [*Pimenta Pimento* of Bello, not of Grisebach.]

Wooded hills and forests in wet or moist districts, Porto Rico; St. Thomas (ex Eggers); Tortola:—Hispaniola. LIMONCILLO. CINNAMON BUSH.

4. **MYRCIA** DC.; Guill. Dict. Class. Nat. 11: 378, 401. 1826.

Trees or shrubs, with opposite punctate pinnately veined leaves, and small flowers in terminal and axillary panicles. Calyx-tube scarcely, or not at all produced beyond the ovary, the limb mostly 5-lobed. Petals mostly 5. Stamens many, in several series, the anthers filiform. Ovary usually 2-celled; ovules 2 in each cavity; style very slender; stigma very small. Berry crowned by the persistent calyx-lobes, 1-2-seeded. Seeds subglobose, the radicle curved, the cotyledons large. [Greek, like *Myrtus*.] A very large genus, the species perhaps as many as 500, natives of tropical America. Type species: *Myrtus coriacea* Vahl.

Calyx-tube produced beyond the nearly glabrous ovary.

Leaves ovate to oblong or elliptic, obtuse or acute.

Leaves elliptic to ovate-lanceolate, acuminate.

Calyx-tube not produced beyond the silky ovary.

Panicles and twigs glabrate or pubescent.

Leaves densely reticulate-veined; fruit little longer than thick.

Leaves pinnately veined; fruit twice as long as thick.

Panicles and twigs densely brown-tomentose.

Affinity unknown.

1. *M. citrifolia*.

2. *M. leptoclada*.

3. *M. splendens*.

4. *M. Berberis*.

5. *M. deflexa*.

6. *M. (?) Pagani*.

1. *Myrcia citrifolia* (Aubl.) Urban, Repert. 16: 150. 1919.

Myrtus citrifolia Aubl. Pl. Guian. 1: 513. 1775.

Eugenia paniculata Jacq. Coll. 2: 108. 1788.

Myrtus coriacea Vahl, Symb. 2: 59. 1791.

Myrcia coriacea DC. Prodr. 3: 243. 1828.

Eugenia acetosans Poir. in Lam. Encycl. Suppl. 3: 125. 1813.

Aulomyrcia coriacea Berg, Linnaea 27: 70. 1855.

Myrtus trifida Sessé & Moc. Fl. Hisp. ed. 2. 124. 1894.

Myrcia paniculata Krug & Urban, Bot. Jahrb. 19: 577. 1895.

A tree, up to about 15 m. high, usually lower, sometimes shrubby, with slender puberulent twigs. Leaves oblong, elliptic or ovate, glabrous or nearly so, chartaceous or coriaceous, shining, 2-6 cm. long, the apex obtuse or acute, the base narrowed, the margin more or less revolute, the petioles 2-4 mm. long, puberulent; panicles terminal, glabrous, few-several-flowered; pedicels slender, 5-15 mm. long; hypanthium glabrous; calyx-tube slightly produced beyond the ovary, its lobes short, rounded; petals 2-3 mm. long, obtuse, punctate; fruit globular, 6-9 mm. in diameter. [? *Myrtus nitida* Sessé and Mocino, not of Vahl.]

Thickets, forests and hillsides, Porto Rico, at lower and middle elevations in wet or moist districts; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Cuba; St. Martin and Saba to Barbados. Doubtfully recorded from Hispaniola. HOYA MENUDA.

2. *Myrcia leptoclada* DC. Prodr. 3: 244. 1828.

Aulomyrcia leptoclada Berg, Linnaea 27: 40. 1855.

A tree, up to about 10 m. high, or shrubby, glabrous throughout, or the young slender twigs sparingly puberulent. Leaves elliptic to ovate-lanceolate,

chartaceous, shining, 5–10 cm. long, the apex acuminate, the base narrowed, the margins not revolute, the petioles 3–6 mm. long; panicles terminal and axillary, loosely several-many-flowered; pedicels very slender, 3–10 mm. long; hypanthium glabrous; calyx-tube a little produced beyond the ovary, its lobes broadly ovate; petals about 1.5 mm. long; fruit globose, about 6 mm. in diameter. [*Myrcia divaricata* of Bello and of Stahl, not of de Candolle; *Myrcia Kegeliana* of Klaerskou, not of Berg; ? *Myrtus acuminata* of Sessé and Moçino, not of Miller.]

Forests and wooded hills in wet or moist districts, Porto Rico, mostly at higher elevations:—Hispaniola; Guadeloupe; Martinique; St. Vincent; Trinidad. Doubtfully recorded from Jamaica. GUAYABACON.

3. *Myrcia splendens* (Sw.) DC. Prodr. 3: 244. 1828.

Myrtus splendens Sw. Prodr. 79. 1788.

Myrcia sororia DC. Prodr. 3: 243. 1828.

A tree, up to 10 m. high, sometimes flowering as a shrub, the slender twigs, the young leaves, the petioles and inflorescence pubescent. Leaves glabrous when mature, chartaceous, strongly shining, 3–7 cm. long, densely reticulate-veined, ovate to lanceolate, the apex acuminate, the base obtuse or narrowed, the petioles 2–4 mm. long; panicles mostly axillary, sometimes also terminal, several-many-flowered; pedicels very short; hypanthium pubescent; calyx-tube not prolonged beyond the ovary, its lobes ovate, unequal; petals nearly orbicular, sericeous, about 2 mm. long; fruit oval, obovoid or subglobose, 6–8 mm. long.

Thickets and woodlands in wet or moist districts at lower and middle elevations, Porto Rico, ascending into the eastern mountains; St. Croix; Tortola:—Cuba; Hispaniola; Saba to Trinidad. Doubtfully recorded from St. Thomas, probably erroneously. RAMA MENUDA. PUNCH BERRY.

4. *Myrcia Berberis* DC. Prodr. 3: 254. 1828.

Similar to *M. splendens*, but not known to form so large a tree, the twigs, petioles and inflorescence somewhat pubescent. Leaves ovate to lanceolate, 2–8 cm. long, less strongly reticulate-veined than those of *M. splendens*, the apex acuminate, the base narrowed or obtuse; panicles axillary and terminal, mostly many-flowered; hypanthium pubescent; petals small; fruit oblong or obovoid, 8–15 mm. long. [*M. divaricata* of Grisebach, not of de Candolle.]

Monte Jimenes, Sierra de Luquillo (according to Urban) collected only by Sintenis:—Montserrat to Tobago; northern South America. We have not seen Porto Rico specimens; those collected by Sintenis were referred to this species by Urban with hesitation; they may represent an undescribed one.

5. *Myrcia deflexa* (Poir.) DC. Prodr. 3: 244. 1828.

Eugenia deflexa Poir. in Lam. Encycl. Suppl. 3: 124. 1813.

Myrcia Humboldtiana DC. Prodr. 3: 256. 1828.

Myrcia ferruginea Berg, Linnaea 27: 90. 1855.

A tree, 8–18 m. high, perhaps sometimes flowering as a shrub, the twigs, young leaves, petioles and inflorescence densely brown-tomentose. Leaves oblong, oblong-lanceolate or elliptic, coriaceous, 5–15 cm. long, glabrous and shining above, pubescent on the veins beneath, strongly pinnately veined, the apex acuminate or acute, the base narrowed or obtuse, the petioles 3–6 mm. long; panicles terminal or axillary, usually many-flowered; pedicels short; hypanthium tomentose; calyx-tube not prolonged beyond the ovary, its lobes suborbicular; petals about 3 mm. long; fruit oval, 6–7 mm. long.

Woodlands and forests in wet or moist districts, Porto Rico, ascending to higher elevations:—Cuba; Hispaniola; Guadeloupe to Trinidad and northern South America. The wood is hard, reddish, heavy and strong. CIENEGUILLO.

6. **Myrcia** (?) **Pagani** Krug & Urban, Bot. Jahrb. **19**: 587. 1895.

Described as a tree up to 20 m. high, the young twigs villous, compressed, the leaves oval to elliptic-oblong, 10–16 cm. long, 4–9 cm. wide, the apex rounded or obtuse, the base narrowed, the petioles 4–5 mm. long, the under side reticulate-veined.

Primeval forest near Guajateca, Sierra de Lares, collected only by Sintenis, its flowers and fruit unknown. AUSU.

5. **PLINIA** [Plum.] L. Sp. Pl. 516. 1753.

Trees or shrubs with chartaceous or subcoriaceous punctate leaves, the inflorescence lateral, axillary or terminal. Calyx subturbinate or hemispheric, closed in the bud, irregularly rupturing in anthesis. Petals 4 or 5. Stamens numerous, in several series; filaments filiform; anther-sacs longitudinally dehiscent. Ovary 2–4-celled; ovules mostly 2 in each cavity; style filiform; stigma small. Berry globose. Seeds 1 or few. Embryo nearly straight, the radicle long, incurved. [Dedicated to Pliny.] Perhaps 50 species or more, natives of tropical America. Type species: *Plinia pinnata* L.

Leaves ovate to elliptic, petioled, narrowed or cuneate at the base; inflorescence nearly sessile.

Leaves ovate-orbicular, sessile, rounded or subcordate at the base; inflorescence peduncled.

1. *P. Dussii*.

2. *P. Sintenisii*.

1. **Plinia Dussii** (Krug & Urban) Urban, Repert. **15**: 413. 1919.

Marlieria Dussii Krug & Urban, Bot. Jahrb. **19**: 590. 1895.

A small tree, up to about 10 m. high, or shrubby, the young twigs short-pilose. Leaves ovate to elliptic, subcoriaceous, 2–4 cm. long, glabrous, shining, deep green above, pale green beneath, the apex bluntly acuminate or obtuse, the base mostly narrowed or cuneate, the petioles 6 mm. long or shorter; inflorescence subsessile, lateral or axillary, few-flowered; pedicels 1–3 mm. long; buds obovoid, glabrous, 3–4 mm. long; calyx-lobes 4; petals 4, white, about 1 mm. long, puberulent; berry 6–8 mm. in diameter.

Mountain forests, central and western districts of Porto Rico:—Guadeloupe; Martinique.

2. **Plinia** (?) **Sintenisii** (Kiaersk.) Britton.

Marlierea Sintenisii Kiaersk. Bot. Tids. **17**: 252. 1889.

A shrub, 3–4 m. high, the young twigs and inflorescence ferruginous-tomentose. Leaves ovate-orbicular or ovate, sessile or very short-petioled, about 9 cm. long or shorter, glabrous or somewhat tomentose, rounded at the apex, subcordate at the base; panicles small; peduncle 6–25 mm. long; flowers glomerate, sessile; flower-buds obovoid, blunt, 2.5 mm. long; calyx 4-lobed; petals 4, obovate, 1.5 mm. long; stamens about twice as long as the petals.

Monte Jimenes, Sierra de Luquillo, collected only by Sintenis. Endemic. Complete specimens are needed to make the generic position of this species certain; its fruit is unknown.

6. **CALYPTRANTHES** Sw. Prodr. 79. 1788.

[CHYTRACULIA P. Br. Hist. Jam. 239. Hyponym. 1756.]

Evergreen shrubs or trees, with opposite coriaceous or subcoriaceous leaves, and small paniced cymose or rarely solitary flowers. Calyx closed at anthesis, circumscissile, the top falling away like a cap or calyptra. Petals none. Stamens

numerous, in several series; filaments filiform; anthers longitudinally dehiscent. Ovary 2–3-celled; ovules 2 in each cavity. Fruit a 1–few-seeded berry, crowned by the basal part of the calyx. Seeds subglobose, the radicle long, the cotyledons large. [Greek, referring to the cap-like lid of the calyx.] About 75 species, of tropical and subtropical America. Type species: *Calyptranthes Chytraculia* (L.) Sw.

Inflorescence paniculate or cymose; leaves 3–8 cm. long.

Leaves acuminate.

Fruit 4–5 mm. in diameter.

Fruit 6–7 mm. in diameter.

Leaves acute or obtuse.

Leaves oblong-obovate.

Leaves elliptic to ovate.

Flowers solitary, sessile; leaves 2.5 cm. long or less.

Flowers and fruit unknown; leaves obovate, 2.5 cm. long or less.

1. *C. pallens*.

2. *C. Sintenisii*.

3. *C. thomasiana*.

4. *C. portoricensis*.

5. *C. Krugii*.

6. *C. Kiaerskovii*.

1. *Calyptranthes pallens* (Poir.) Griseb. Kar. 67. 1857.

Eugenia pallens Poir. in Lam. Encycl. Suppl. 3: 122. 1813.

Calyptranthes Chytraculia ovalis Berg, Linnaea 27: 27. 1855.

Calyptranthes Chytraculia zuzygium Berg, Linnaea 27: 28. 1855.

A tree, attaining a maximum height of about 10 m., with a trunk sometimes 1.5 dm. in diameter, usually smaller and sometimes shrubby, the bark thin and light gray, the young twigs pubescent, soon becoming glabrous. Leaves elliptic to oblong-elliptic, 3–8 cm. long, acuminate at the apex, narrowed at the base, shining above, the petioles 5–12 mm. long; panicles as long as the leaves or longer, pubescent, many-flowered, the flowers sessile or nearly so, about 3 mm. broad; fruit subglobose or oval, 4–5 mm. in diameter. [*C. Chytraculia* of West and of Krebs, not of Swartz.]

Base of limestone cliffs, Mona; St. Croix; St. Thomas:—Florida; Bahamas; Jamaica; Cuba; Hispaniola; Cayman Islands; Guadeloupe. WHITE STOPPER.

2. *Calyptranthes Sintenisii* Kiaersk. Bot. Tids. 17: 250. 1889.

A tree, up to about 10 m. high, or sometimes shrubby, the slender brownish twigs and the petioles sparingly appressed-pubescent. Leaves elliptic, chartaceous, 5–9 cm. long, flat, the numerous lateral veins slender, the upper surface bright green and faintly shining, the under surface pale and dull, sometimes slightly pubescent, the apex abruptly bluntly acuminate, the base narrowed or obtuse, the petioles 3–8 mm. long; panicles axillary, several-many-flowered, mostly shorter than the leaves, slender-peduncled, glabrous or nearly so; flower-buds about 3 mm. long; fruit subglobose, 6–7 mm. in diameter. [*C. Chytraculia* of Bello, not of Swartz.]

Forests at lower and middle elevations in moist districts of Porto Rico:—Hispaniola. LIMONCILLO DE MONTE.

3. *Calyptranthes thomasiana* Berg, Linnaea 27: 26. 1855.

Chytraculia thomasiana Kuntze, Rev. Gen. Pl. 258. 1891.

A shrub, 3 m. high or a small tree, the twigs, young leaves and panicles strigose, the branches glabrous. Leaves subobovate-oblong, rigidly coriaceous, 2–4.5 cm. long, impressed-punctate on both sides, shining and obsoletely veined above, dull and very indistinctly veined beneath, the apex narrowed and obtuse, the base cuneate, the petioles about 4 mm. long; inflorescence subaxillary, the cymes trichotomous; flower-buds obovoid, apiculate, 3 mm. long; petals 4, small, spatulate.

Signal Hill and Bolongo, St. Thomas. Endemic. Known to us only from descriptions.

4. *Calyptranthes portoricensis* Britton, Bull. Torr. Club 51: 11. 1924.

A tree or shrub, the twigs and inflorescence densely brown-pubescent. Leaves elliptic or ovate-elliptic, coriaceous, glabrous above, pubescent beneath when young, 3-7 cm. long, very obscurely punctate, the apex rounded or acutish, the base obtuse, the midvein prominent beneath, the lateral venation obscure; peduncles rather stout, 7 cm. long or shorter; panicles several-flowered, the flowers subglomerate, nearly sessile; calyx densely brown-pubescent, about 2 mm. long, obovoid, rounded; fruit finely pubescent, globose, about 5 mm. in diameter.

Vicinity of Maricao, Porto Rico. Endemic.

5. *Calyptranthes Krugii* Kiaersk. Bot. Tids. 17: 248. 1889.

A shrub, or a small tree up to about 6 m. high, much branched, the branches forked, the short young twigs tomentose. Leaves obovate, small, coriaceous, 1.5-2.5 cm. long, pubescent when young, glabrous when mature, dark green and obsoletely veined above, light green and rather strongly pinnately veined beneath, the apex obtuse or rounded, the base cuneate or narrowed, the stout pubescent petioles 2 mm. long or less; flowers solitary and sessile or nearly so in the axils; flower-buds about 4 mm. long; calyx pubescent.

Forests at middle and higher altitudes in the eastern mountains of Porto Rico. Endemic.

6. *Calyptranthes Kiaerskovii* Krug & Urban; Urban Symb. Ant. 1: 42. 1898.

Calyptranthes obovata Krug & Urban, Bot. Jahrb. 19: 600. 1895. Not Kiaersk.

Glabrous; branches dichotomously forked. Leaves obovate, 2.5 cm. long or less, 1-2 cm. wide, chartaceous or subcoriaceous, minutely punctate, the apex obtuse or rounded, the base cuneate or narrowed, shining above, pale beneath, the venation rather prominent on the upper surface, somewhat reticulated, the petioles 1-2.5 mm. long.

Tortola (Eggers 3217). Endemic. Known only from its foliage.

Calyptranthes paniculata Grosourdy, recorded by the author as Porto Rican in 1864, called LIMONCILLO, has not been identified by subsequent botanists.

7. *GOMIDESIA* Berg, Linnaea 27: 6. 1854.

Trees or shrubs with opposite leaves, the flowers mostly in axillary or terminal panicles. Calyx 5-lobed. Petals 5. Stamens many in several series; filaments distinct; anthers 4-celled, two anther-sacs higher than the other two. Ovary 2-5-celled; style filiform; stigma small, simple. Berry 1-4-seeded, crowned by the calyx-lobes. Radicle elongated; cotyledons foliaceous. [Commemorates Dr. Gomides, a Brazilian physician.] Perhaps 40 species, of tropical America, mostly Brazilian. Type species: *Myrcia spectabilis* DC. (?).

1. *Gomidesia Lindeniana* Berg, Linnaea 29: 208. 1858.

Myrcia Sintenisii Kiaersk. Bot. Tids. 17: 257. 1890.

A tree, 4-10 m. high, or sometimes shrubby, the twigs, inflorescence and under leaf-surfaces densely brown-tomentose. Leaves oblong to elliptic, coriaceous, glabrous and dark green above, 6-12 cm. long, strongly pinnately veined, the apex acute or acuminate, the base narrowed, the stout petioles 8 mm. long or less; panicles axillary and terminal, mostly somewhat shorter than the leaves, many-

flowered; flowers fragrant, nearly sessile; bractlets ovate, about 4 mm. long; calyx-lobes about 1.5 mm. long; petals white, suborbicular, about 3 mm. long; fruit subglobose, red, turning black, tomentose, about 8 mm. in diameter.

Forests in wet or moist districts, Porto Rico:—Jamaica; Cuba; Hispaniola; St. Kitts; Montserrat; Brazil. CIENEGUILLO.

8. *EUGENIA* L. Sp. Pl. 470. 1753.

Shrubs or trees, with usually glabrous foliage. Leaves opposite, punctate, commonly leathery, pinnately-veined, the flowers mostly axillary, solitary, or in umbel-like, raceme-like or congested clusters. Calyx-lobes 4 or 5. Petals 4 or 5, white. Stamens numerous; filaments filiform, distinct and in several series, or aggregated into 4 groups and slightly united. Ovary sessile, 2–3-celled. Ovules several in each cavity. Berries crowned by the calyx-lobes. Seeds often 1–4. Embryo with thick cotyledons and a short radicle. [Named in honor of Prince Eugene of Savoy (1663–1736), a patron of botany and horticulture.] About 600 species, of tropical distribution. The Spanish name *HOYA MENUDA* and the English name *STOPPER* are applied to many of the species. Type species: *Eugenia uniflora* L.

A. Flowers axillary to linear bracts mostly below the leaves, long-peduncled, mostly solitary.

Leaves ovate to ovate-lanceolate, the base obtuse or rounded; fruit grooved.

Leaves oblong, the base narrowed; fruit not grooved.

B. Inflorescence racemose, paniced, glomerate, or solitary.

1. Flowers pedicelled.

a. Flowers small; calyx-lobes 5 mm. long or less; pedicels slender.

*Inflorescence racemose or racemose-paniculate.

Leaves 5–16 cm. long; fruit 10–15 mm. in diameter.

Fruit smooth; pedicels 4–10 mm. long.

Fruit verrucose; pedicels only 1 mm. long.

Leaves 7.5 cm. long or less; fruit 6–8 mm. in diameter.

**Inflorescence short-racemose, umbellate or glomerate, or pedicels sometimes solitary.

†Inflorescence glomerate or short-racemose; flowers short-pedicelled.

‡Leaves obovate to oblong-lanceolate, rounded or obtuse at the apex.

‡‡Leaves ovate to elliptic or lanceolate, acute, obtusish or acuminate.

Leaves 1–5 cm. long; fruit 3–5 mm. in diameter.

Leaves dark green above, pale beneath, very short-petioled.

Leaves about equally green on both sides, manifestly petioled.

Twigs and inflorescence puberulent.

Twigs and inflorescence tomentose.

Leaves 4–9 cm. long, manifestly petioled; fruit 7–10 mm. in diameter.

††Inflorescence umbellate, or flowers solitary; flowers slender pedicelled.

Fruit 4–9 mm. in diameter; leaves 2–7 cm. long.

Twigs glabrous.

Leaves shining, strongly veined.

Leaves dull, faintly veined.

Twigs pubescent; fruit black.

Fruit 10–15 mm. in diameter; leaves larger.

b. Flowers large; calyx-lobes 7–10 mm. long; pedicels stout.

Leaves elliptic to obovate, narrowed at base, short-petioled.

Leaves orbicular, subcordate, sessile.

1. *E. uniflora*.

2. *E. ligustrina*.

3. *E. aeruginea*.

4. *E. Eggersii*.

5. *E. lancea*.

6. *E. buxifolia*.

7. *E. monticola*.

8. *E. Underwoodii*.

9. *E. boqueronensis*.

10. *E. axillaris*.

11. *E. confusa*.

12. *E. rhombea*.

13. *E. procera*.

14. *E. pseudopsidium*.

15. *E. Stahlii*.

16. *E. borinquensis*.

2. Flowers sessile, or essentially sessile.
 - a. Leaves rounded or obtuse at the apex.
 Calyx-lobes only about 1-2 mm. long; fruit small.
 Leaves rounded or cordate at the base.
 Leaves 2-3.5 cm. long, rounded, pale beneath.
 Leaves 4-6 cm. long, obtuse, bright green on both sides.
 Leaves narrowed at the base.
 Calyx-lobes 5-6 mm. long; fruit up to 2 cm. in diameter.
 - b. Leaves long-acuminate.
 - C. Species not grouped, incompletely known
17. *E. cordata*.
 18. *E. Stewardsonii*.
 19. *E. Sintenisii*.
 20. *E. sessiliflora*.
 21. *E. floribunda*.
 22. *E. serrasuela*.
 23. *E. Bellonis*.
 24. *E. (?) corozalensis*.
 25. *E. (?) xerophytica*.

1. ***Eugenia uniflora* L. Sp. Pl. 470. 1753.**

Eugenia Michellii Lam. Encycl. 3: 205. 1789.

A shrub, or small tree up to 5 m. high, with slender branches. Leaves ovate to ovate-lanceolate, dark green and shining above, paler beneath, bluntly acute or acuminate at the apex, rounded at the base, dotted, thin in texture, 2.5-6 cm. long; pedicels solitary or few together, very slender, glabrous, about 2.5 cm. long, bracted at the base and 2-bracteolate near the summit; calyx-lobes linear-oblong, obtusish; petals about twice as long as the calyx-lobes; fruit subglobose, longitudinally furrowed, 8-10 mm. in diameter, bright red, pleasantly acid, edible.

Spontaneous after planting for its fruit, St. Croix; St. Thomas:—widely planted in tropical regions. Native of tropical America. SURINAM CHERRY. CEREZO DE CAYENA.

2. ***Eugenia ligustrina* (Sw.) Willd. Sp. Pl. 2: 962. 1800.**

Myrtus ligustrina Sw. Prodr. 78. 1788.

Myrtus cerasina Vahl, Symb. 2: 57. 1791.

Stenocalyx ligustrinus Berg, Linnaea 27: 312. 1856.

Myrtus bracteiflora Sessé & Moc. Fl. Mex. ed. 2, 124. 1894.

A shrub, or a small tree 5-8 m. high, glabrous throughout, the twigs very slender. Leaves oblong to narrowly elliptic, subcoriaceous, shining, 2-5 cm. long, dark green above, pale beneath, the apex obtuse or acutish, the base narrowed, the petioles 2-5 mm. long; peduncles nearly filiform, 2-3 cm. long, mostly solitary in the axils of linear bracts below the leaves; calyx-lobes about 5 mm. long; petals 8-12 mm. long; fruit globose, not grooved, punctate, about 8 mm. in diameter. [*Eugenia buxifolia* of Bello, not of Willdenow.]

Woodlands, hillsides and thickets, Porto Rico, mostly in the southern dry districts; Culebra; Vieques; St. Croix; St. Thomas; St. Jan:—Jamaica; Cuba; Hispaniola; St. Martin to Trinidad; Brazil. PALO DE MULTA. PRIVET STOPPER. BIRCH-BERRY.

3. ***Eugenia aeruginea* DC. Prodr. 3: 283. 1828.**

Eugenia domingensis Berg, Linnaea 27: 296. 1856.

Eugenia calyculata Bello, Anal. Soc. Esp. Hist. Nat. 10: 271. 1881.

A tree, up to 20 m. high with a trunk up to 6 dm. in diameter, the young twigs, leaves and inflorescence pubescent, the bark whitish. Leaves elliptic to ovate-elliptic or oblong-lanceolate, chartaceous, 6-11 cm. long, glabrous or nearly so when mature, shining, the apex acuminate, the base narrowed or obtuse, the slender petioles 5-12 mm. long; flowers in axillary or lateral simple or compound racemes shorter than the leaves; pedicels 4-10 mm. long; bractlets 2, obtusish, connate at base, about 1 mm. long; outer calyx-lobes about 2 mm. long; petals suborbicular, about 4 mm. long; fruit oval, or subglobose, purple, 10-15 mm. long. [*E. tetrasperma* of Stahl, not of Bello; ? *Myrtus Cumini* of Sessé & Mocino, not of Linnaeus.]

Thickets and woodlands at lower and middle elevations, Porto Rico:—Cuba; Hispaniola; Dominica; Martinique; St. Vincent; Trinidad; doubtfully recorded from Jamaica. The light brown wood is hard, strong and heavy. GUASAVARA.

4. *Eugenia Eggersii* Kiaersk. Bot. Tids. 17: 268. 1890.

A shrub, or a tree up to about 20 m. high, the young twigs, leaves and inflorescence appressed-pubescent, the mature foliage glabrous. Twigs slender, terete; leaves oblong to elliptic or oblong-lanceolate, subchartaceous, 5–16 cm. long, the apex acuminate, acute or rarely obtuse, the base narrowed or obtuse, the petioles 4–11 mm. long; flowers in short axillary racemes; pedicels very short, about 1 mm. long; bractlets acute, 1–2 mm. long; calyx-lobes verrucose-glandular, rounded, the outer 2–2.5 mm. long; petals oval, about 6 mm. long; fruit globular, verrucose, 10–13 mm. in diameter.

Forests at higher elevations in the central and eastern mountains of Porto Rico. Endemic. GUASAVARA.

5. *Eugenia lancea* Poir. in Lam. Encycl. Suppl. 3: 123. 1813.

Myrtus lancea Spreng. Syst. 2: 482. 1825.

Eugenia virgultosa DC. Prodr. 3: 280. 1828.

Eugenia ludibunda Bert.; DC. Prodr. 3: 280. 1828.

Eugenia biflora ludibunda Krug & Urban, Bot. Jahrb. 19: 630. 1895.

Eugenia biflora lancea Krug & Urban, loc. cit. 631. 1895.

Myrcia (?) *thomasi* DC. Prodr. 3: 244. 1828.

A much-branched shrub, or a small tree 4–6 m. high, the slender twigs, petioles and inflorescence puberulent. Leaves oval, ovate or oblong-lanceolate, rarely obovate-oval, chartaceous or subcoriaceous, 2–7.5 cm. long, the apex bluntly acuminate or acute, the base narrowed or obtuse, the petioles 3–12 mm. long; flowers in axillary racemes mostly shorter than the leaves; bractlets about 1 mm. long; pedicels 3–12 mm. long; calyx-lobes broad, about 2 mm. long; petals orbicular-obovate, 3–4.5 mm. long; fruit globose, 6–8 mm. in diameter. [*E. portoricensis* of Stahl, not of de Candolle; *E. glabrata* of Berg and of Eggers, not of de Candolle; *Myrtus virgultosa* of Vahl, not of Swartz; *Eugenia pallens* of Eggers.]

Thickets at lower elevations, Porto Rico, mostly in moist districts; Culebra; Vieques; St. Croix; St. Thomas; Tortola; Virgin Gorda:—Hispaniola; St. Martin. Recorded from Jamaica, perhaps erroneously. PITANGUEIRA. BLACK ROD-WOOD.

6. *Eugenia buxifolia* (Sw.) Willd. Sp. Pl. 2: 960. 1800.

Myrtus buxifolia Sw. Prodr. 78. 1788.

Eugenia foetida Poir. in Lam. Encycl. Suppl. 3: 129. 1813.

A small tree, becoming about 6 m. high, with a trunk up to 3 dm. in diameter, usually smaller, often shrubby, the bark reddish-brown, scaly, the slender twigs sparingly pubescent or glabrous. Leaves obovate, oblanceolate or nearly oblong, glabrous, 2–4 cm. long, rounded or obtuse at the apex, narrowed at the base, short-petioled, dark green above, pale green beneath; inflorescence axillary or lateral, 1–few-flowered; pedicels pubescent, very short; calyx 4-lobed, the lobes obtuse; petals oblong, 2–3 mm. long; fruit oval to subglobose, black, 5–7 mm. in diameter.

Coastal woods and thickets, Porto Rico, in the dry southwestern districts; Mona; Muertos; Vieques; St. Croix; St. Thomas (according to Krebs and to Eggers):—Florida; Bahamas; Jamaica; Cuba; Hispaniola. ANGUILLA. SPANISH STOPPER.

7. *Eugenia monticola* (Sw.) DC. Prodr. 3: 275. 1828.

Myrtus monticola Sw. Prodr. 78. 1788.

Eugenia flavovirens Berg, Linnaea 27: 184. 1856.

A shrub, or a tree up to about 10 m. high, the branches often virgate, the numerous, very slender twigs and the petioles puberulent. Leaves commonly crowded and appearing distichous, glabrous or nearly so, lanceolate to ovate,

subcoriaceous, dark green above, pale beneath, 1.5–4 cm. long, the apex mostly bluntly acute or acuminate, the base narrowed, the petioles 1–2.5 mm. long; inflorescence glomerate in the axils, several-many-flowered; pedicels 1–5 mm. long; bractlets very small; calyx-lobes 1–1.5 mm. long; petals about 2 mm. long; fruit globose, black when mature, about 5 mm. in diameter. [*E. foetida* of West, not of Poiret; *E. Poiretii* of Berg, not of de Candolle.]

Thickets and woodlands, Porto Rico, at lower and middle elevations in moist and dry districts; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Jamaica; Cuba; Hispaniola; St. Martin to Trinidad. BIRLI. SLANG BERRY. RED ROD-WOOD. BLACK CHERRY.

Eugenia monticola latifolia Krug & Urban, similar to *E. monticola* but with leaves up to 8 cm. long, was recorded by Urban as found in St. Croix.

8. *Eugenia Underwoodii* Britton, Bull. Torr. Club 51: 10. 1924.

A shrub, 2.5–3 m. high, much branched, the very slender gray terete twigs puberulent when young, the inflorescence pubescent. Leaves elliptic or elliptic-lanceolate, chartaceous, 2–5 cm. long, slightly paler green beneath than above somewhat shining, delicately veined and scarcely reticulated, rather coarsely punctate, flat, the apex acuminate, the base narrowed, the puberulent petioles 1.5–2.5 mm. long; flowers in small short-peduncled racemes near the ends of the twigs; pedicels 2–3 mm. long; bractlets about 1 mm. long; calyx-tube campanulate, glabrate, about 1.5 mm. long, the lobes a little shorter, puberulent, ciliate, obtuse; petals nearly 2 mm. long; fruit unknown.

Yauco, Porto Rico. Endemic.

9. *Eugenia boqueronensis* Britton, Bull. Torr. Club 51: 10. 1924.

A tree, about 8 m. high, the slender short twigs gray, densely tomentose when young. Leaves ovate or elliptic-ovate, coriaceous, 2–3.5 cm. long, shining, nearly equally green on both sides, coarsely blackish-punctate, finely pinnately veined and scarcely reticulated, pubescent on the midvein beneath when young, glabrous or very nearly so when mature, the apex abruptly and bluntly acuminate, the base narrowed, the stout pubescent petioles 2–3 mm. long; racemes few-flowered, about 1 cm. long, borne in the uppermost axils, densely tomentose; pedicels about 3 mm. long; bractlets oblong, shorter than the pedicels; calyx-lobes broad, rounded or obtuse, about 1.5 mm. long; petals rounded, not longer than the calyx-lobes; fruit unknown.

Base of limestone hill, Salinas de Boqueron, Porto Rico. Endemic.

10. *Eugenia axillaris* (Sw.) Willd. Sp. Pl. 2: 970. 1800.

Myrtus axillaris Sw. Prodr. 78. 1788.

Psidiastrum dubium Bello, Anales Soc. Esp. Hist. Nat. 10: 272. 1881.

A shrub or tree, sometimes reaching a height of 12 m., with a maximum trunk diameter of about 3 dm., the bark shallowly fissured, the branchlets terete, glabrous. Leaves elliptic-ovate to ovate-lanceolate or nearly elliptic, unpleasantly odorous, glabrous, chartaceous, 4–9 cm. long, revolute-margined, paler beneath than above and black-dotted, the petioles 2–5 mm. long, margined; racemes short, axillary; pedicels short, pubescent; calyx-lobes 4, rounded; corolla 3–4 mm. broad; petals 4, surpassing the calyx-lobes, glandular-punctate; fruit depressed-globose, 7–10 mm. in diameter, black, smooth, glandular-punctate, sweet, often deformed and enlarged. [*E. flavovirens* of Stahl, not of Berg.]

Thickets and woodlands at lower and middle elevations, Porto Rico; Mona; Muertos; Desecheo; Icacos; Vieques; St. Croix; St. Thomas; Anegada:—Florida; Bermuda; Bahamas; Jamaica; Cayman Islands; Cuba; Hispaniola; St. Martin to Guadeloupe and Marie Galante. WATTLE. KRUM BERRY.

11. *Eugenia confusa* DC. Prodr. 3: 279. 1828.

Eugenia Krugii Kiaersk. Bot. Tids. 17: 259. 1890.

A tree, attaining a maximum height of about 18 m., with a trunk up to 5 dm. in diameter, usually much smaller, the bark scaly, the slender twigs glabrous. Leaves ovate to lanceolate, coriaceous, glabrous, 3–6 cm. long, long-acuminate at the apex, narrowed or obtuse at the base, dark green and shining above, dull green beneath, pinnately many-veined, the slender petioles 5–10 mm. long; flowers umbellate or solitary in the axils, on filiform pedicels 2–3 times as long as the petioles; calyx-lobes broadly ovate, 1.5–2 mm. long; petals ovate, about twice as long as the calyx-lobes; fruit subglobose, orange to scarlet, 5–6 mm. in diameter.

Forest, Monte Alegreillo, near Maricao:—Florida; Bahamas; Jamaica; Cuba; Guadeloupe; Dominica. Recorded from the Virgin Islands, apparently erroneously. CIENEGUILLO. IRONWOOD.

12. *Eugenia rhombea* (Berg) Krug & Urban, Bot. Jahrb. 19: 644. 1895.

Eugenia foetida rhombea Berg, Linnaea 27: 212. 1856.

Eugenia foetida parvifolia Berg, Linnaea 27: 212. 1856.

A small tree, sometimes 8 m. high with a trunk up to 3 dm. in diameter, or shrubby, the twigs slender, the smooth bark gray, the foliage glabrous. Leaves ovate to elliptic or rhombic-ovate, rather thin, inconspicuously veined, 3–6 cm. long, bluntly acuminate or acute at the apex, obtuse or narrowed at the base, short-petioled; flowers in sessile axillary umbels, often appearing on twigs from which the leaves have fallen, the slender glabrous pedicels 8–15 mm. long; calyx-tube shorter than the 4 rounded lobes; petals ovate, about 5 mm. long, about twice as long as the calyx-lobes; fruit depressed-globose, orange, red or nearly black, 0.8–1.5 cm. in diameter. [*Eugenia pallens* of Eggers; *E. Poiretti* of Millspaugh, not of de Candolle.]

Coastal thickets in the southwestern districts of Porto Rico; Desecheo, Muertos; Mona; St. Croix; St. Thomas (according to Berg):—Florida; Bahamas; Jamaica; Cuba; Hispaniola; Saba; St. Martin; St. Eustatius; Antigua; Guadeloupe. RED STOPPER.

13. *Eugenia procera* (Sw.) Poir. in Lam. Encycl. Suppl. 3: 129. 1813.

Myrtus procera Sw. Prodr. 77. 1788.

Myrtus brachystemon DC. Prodr. 3: 240. 1828.

A shrub, or a tree 4–10 m. high, the young twigs slender, pubescent. Leaves ovate or oblong-ovate, chartaceous, 6 cm. long or less, glabrous, finely reticulate-veined, the apex bluntly acuminate, the base narrowed, the petioles 2–4 mm. long; flowers in sessile axillary umbels; pedicels very slender, puberulent, 6–15 mm. long; calyx-lobes thin, rounded, about 1 mm. long; petals about 3 mm. long; fruit subglobose, black, viscid, about 5 mm. in diameter. [*Myrtus cerasina* of Eggers, not of Vahl.]

Woods and thickets at lower and middle elevations, Porto Rico, mostly in dry parts of the southern districts; St. Croix; St. Thomas; St. Jan; Tortola:—Jamaica; Cuba; Hispaniola; St. Martin to Martinique; Trinidad and Curaçao. ROCK MYRTLE.

14. *Eugenia pseudopsidium* Jacq. Enum. 23. 1760.

Myrtus Willdenovii Spreng. Syst. 2: 486. 1825.

Eugenia portoricensis DC. Prodr. 3: 266. 1828.

Eugenia thomasiana Berg, Linnaea 27: 183. 1856.

Stenocalyx portoricensis Berg, Linnaea 29: 246. 1858.

Eugenia pseudopsidium portoricensis Krug & Urban, Bot. Jahrb. 19: 647. 1894.

A shrub, or a tree up to about 12 m. high, the young slender twigs minutely strigose or glabrous. Leaves ovate to elliptic, subchartaceous, glabrous, shining,

4–13 cm. long, the apex acuminate, the base narrowed or obtuse, the petioles 3–8 mm. long; flowers few or solitary in the axils, or also terminal; pedicels very slender, 1–2.5 cm. long; calyx-lobes 2–4.5 mm. long, oblong, obtuse; petals 3–7 mm. long; fruit subglobose, red, smooth, 10–15 mm. in diameter. [*Myrtus parviflora* of Sessé & Mocino, not of Sprengel.]

Woodlands and thickets, Porto Rico, at lower and middle elevations, mostly in moist districts; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Hispaniola; Montserrat; Guadeloupe; Martinique. QUIEBRA HACHA. PETANGUEIRA. BASTARD GUAVA. CHRISTMAS CHERRY. WILD GUAVA.

15. **Eugenia Stahlia** (Kiaersk.) Krug & Urban, Bot. Jahrb. 19: 650. 1895.

Myrtus Stahlia Kiaersk. Bot. Tids. 17: 286. 1890.

A tree, up to about 20 m. in height, glabrous throughout, the twigs rather stout, subterete. Leaves elliptic to elliptic-obovate, coriaceous, 5–10 cm. long, the apex rounded or obtuse, the base narrowed or cuneate, the stout petioles 5–7 mm. long, the lateral venation slender; inflorescence lateral or axillary; flowers subcorymbose or solitary; pedicels stout, 2–3 cm. long; bracts 2–3 mm. long; calyx-lobes 4, suborbicular, coriaceous, glandular-verrucose, the inner ones 7–9 mm. long, nearly twice as long as the outer; petals suborbicular, 10–15 mm. long; fruit subglobose, glandular-verrucose, about 2 cm. in diameter.

Mountain forests at middle and higher elevations, Porto Rico. Endemic. GUAYABOTA.

16. **Eugenia borinquensis** Britton.

Myrtus Sintenisii Kiaersk. Bot. Tids. 17: 284. 1890.

Eugenia Sintenisii Krug & Urban, Bot. Jahrb. 19: 650. 1895. Not Kiaersk. 1890.

A shrub, or a small tree up to about 7 m. high, or perhaps higher, glabrous throughout, the branches forking, the twigs straight, stiff, short, flattened under the internodes. Leaves orbicular, stiff, coriaceous, 4–10 cm. broad, strongly pinnately veined and reticulated, subcordate, rounded, the stout petioles only 1 or 2 mm. long; flowers few or solitary, axillary; peduncles about 2 cm. long; outer calyx-lobes rounded, about 4 mm. long; petals white, purplish mottled, obovate, about 15 mm. long; fruit oval or subglobose, about 2 cm. in diameter, reddish green.

Forests at higher elevations in the eastern mountains of Porto Rico; it forms characteristic thickets near the summit of El Yunque, its broad, light green leaves very conspicuous. Endemic.

17. **Eugenia cordata** (Sw.) DC. Prodr. 3: 272. 1828.

Myrtus cordata Sw. Prodr. 78. 1788.

? *Myrtus ramiflorus* Vahl, in West St. Croix 290. 1795.

Tricera cordifolia Willd. Sp. Pl. 4: 339. 1805.

Buxus cordifolia Spreng. Syst. 3: 847. 1826.

Myrciaria (?) *stirpiflora* Berg, Linnaea 30: 702. 1860.

A shrub, or a tree up to about 5 m. high, the slender young twigs puberulent, otherwise glabrous. Leaves short-ovate, sessile, or nearly so, subcoriaceous, crowded, 2–3.5 cm. long, shining above, pale and dull beneath; the apex rounded, the base rounded to subcordate; flowers sessile, in small lateral or axillary clusters, mostly below the leaves; larger calyx-lobes broad, rounded, about 1 mm. long; petals suborbicular, about 2 mm. long; fruit subglobose to oval, greenish, about 7 mm. long. [*E. lateriflora* of Eggers, not of Vahl.]

Hillsides, Culebra; St. Thomas; St. Jan; Tortola; St. Croix. Endemic. LATHBERRY

18. *Eugenia Stewardsonii* Britton, Bull. Torr. Club 51: 11. 1924.

A tree, 5-10 m. high, glabrous throughout, the slender twigs gray. Leaves ovate, subchartaceous, very nearly sessile, 4-6 cm. long, bright green and shining on both sides, the venation rather prominent, coarsely reticulated, the apex obtuse or rounded, the base rounded or subcordate, the stout petioles about 1 mm. long; flowers sessile, in lateral clusters below the leaves; larger calyx-lobes obtuse, about 2 mm. long; fruit subglobose or depressed-globose, 5-7 mm. in diameter.

Mountain forests and summits, Central Cordillera of Porto Rico. Type from the summit of Monte Torrecillo (Britton, Cowell and Stewardson Brown, 5603). Included by Urban in *Eugenia cordata* (Sw.) DC.

19. *Eugenia Sintenisii* Kiaersk. Bot. Tids. 17: 263. 1890.

Eugenia cordata Sintenisii Krug & Urban; Urban Bot. Jahrb. 19: 656. 1894.

A shrub, or a small tree up to about 5 m. tall, glabrous throughout. Leaves oval to obovate, subchartaceous, 4-8 cm. long, the apex obtuse or rounded, the base narrowed or cuneate, the petioles 1-3 mm. long; flowers sessile in clusters below the leaves or also axillary; calyx-lobes about 1 mm. long; petals suborbicular, about 2 mm. long; fruit subglobose, 4-5 mm. in diameter.

Forests at higher elevations, central and western districts of Porto Rico; Tortola; St. Eustatius to St. Vincent and Bequia; doubtfully recorded from Hispaniola. Recorded from St. Croix, St. Thomas and St. Jan. MURTA.

20. *Eugenia sessiliflora* Vahl, Symb. 3: 64. 1794.

Eugenia lateriflora Willd. Sp. Pl. 2: 961. 1800.

Myrtus sessiliflora Spreng. Syst. 2: 479. 1825.

A shrub or small tree, glabrous throughout, the rather stout branches pale gray. Leaves oval or oval-orbicular, coriaceous, 4-6 cm. long, revolute-margined, the apex rounded or obtuse, the base narrowed or obtuse, the venation rather prominent on both sides, the stout petioles 1.5-4 mm. long; flowers sessile, about 12 mm. broad, in lateral clusters below the leaves; larger calyx-lobes 4-6 mm. long, rounded, black-glandular; petals a little longer; fruit globose, rose-colored, about 2 cm. in diameter.

Hillsides, St. Croix; St. Thomas (according to Eggers); Tortola. Endemic.

21. *Eugenia floribunda* West; Willd. Sp. Pl. 2: 960. 1800.

Myrciaria floribunda Berg, Linnaea 27: 330. 1856.

A tree, reaching a maximum height of about 10 m. with a trunk diameter of 1-3 dm., glabrous throughout, the twigs very slender, the bark separating in thin scales. Leaves lanceolate, ovate-lanceolate or oblong-lanceolate, subchartaceous, 4-7 cm. long, flat, delicately veined, the apex long-acuminate, the base narrowed or obtuse, the slender petioles 2-4 mm. long; flowers sessile, in small axillary and lateral clusters; calyx-lobes rounded, 1-2 mm. long; petals suborbicular, 1.5-2 mm. long; fruit globose, red or yellow, aromatic, 8-10 mm. in diameter. [*Eugenia disticha* of Bello (and of Krebs?), not of de Candolle.]

Woodlands, near Cayey, Lares and Quebradillas, Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan; Tortola;—Cuba; Hispaniola; St. Martin; St. Eustatius; St. Kitts; Martinique; northern South America. The fruit yields an excellent jam and was formerly used in the Virgin Islands in making guava-berry rum. MURTA. GUAVA-BERRY.

22. *Eugenia serrasuela* Krug & Urban, Bot. Jahrb. 19: 652. 1895.

A tree, the bark chinked, the branches cylindric, glabrous. Leaves ovate-oblong, coriaceous, pellucid-punctate, up to 13 cm. long and 6 cm. wide, shining above, the apex bluntly acuminate, the margin recurved, the petioles 5-6 mm.

long, the venation conspicuous; flowers subsessile, 5-parted, clustered at the ends of the branches; calyx-lobes ovate; ovary semiglobose, woolly; fruit globose, pubescent, costate, 2.5 cm. in diameter; seed solitary. [*E. costata* of Bello and of Stahl, not of Camb.]

Near Anones, Porto Rico, according to Bello. The species is known to us from description only, and specimens were, apparently, studied only by Bello, prior to 1881, and none collected since. SERRASUELA.

Barren specimens from a tree 20 m. high, in the Barrio de Maizales, Sierra de Naguabo (*Britton and Cowell, 2202*), may possibly belong to this species.

23. *Eugenia* (?) *Bellonis* Krug & Urban, Bot. Jahrb. 19: 611. 1895.

A low shrub, 0.5–3.5 dm. high, much branched and spreading, the twigs glabrous, or sparingly pilose, subquadrangular, dark purple. Leaves subchartaceous, very small. 1.5 cm. long or less, various in shape, ovate, elliptic, oblong or linear-lanceolate, the apex and base rounded or acute, the venation reticulated, the midvein prominent above, the petioles 2.5 mm. long or less.

Rocky hills near Guanica, Porto Rico; collected only by Sintenis, its flowers and fruit unknown.

24. *Eugenia* (?) *corozalensis* Britton, Bull. Torr. Club 51: 11. 1924.

A tree, about 6 m. high, the rather slender subterete glabrous, forking twigs slightly enlarged below the internodes. Leaves oval-orbicular, chartaceous, glabrous, sessile, 4–7 cm. long, green on both sides, densely punctate, the apex rounded, the base cordate, the venation slender, loosely reticulated; flowers and fruit unknown.

Limestone hill, Corozal, Porto Rico. Endemic.

25. *Eugenia* (?) *xerophytica* Britton, Bull. Torr. Club 51: 11. 1924.

A shrub, or a small tree up to about 4 m. high, much branched, the slender terete twigs and the leaves glabrous. Leaves suborbicular or some of them a little broader than long, coriaceous, glabrous, shining above, yellow-green and reticulate-veined on both sides, 1.5–5 cm. long, the apex obtuse, rounded or short-tipped; the base subcordate or rounded, the stout petioles 2–4 mm. long; flowers and fruit unknown.

Limestone rocks, El Tuque, near Ponce, Porto Rico;—Muertos. Endemic.

An incomplete specimen of a plant of this family, with slender glabrous twigs, suborbicular glabrous petioled leaves about 2 cm. broad, and axillary, slender-peduncled fruits about 8 mm. in diameter, collected at Guanica, Sept. 12, 1913 (*Stevens and Hess, 3109*) may represent another *Eugenia*.

Eugenia aromatica Grosourdy, recorded as having the Porto Rico name PALO DE CLAVO, has not been identified by subsequent botanists.

Eugenia micrantha Vahl is a plant listed by West from St. Croix, without description, and not otherwise known. (Not *E. micrantha* DC.)

Eugenia emarginata Vahl was also recorded by West from St. Croix, without description. (Not *E. emarginata* DC.)

Eugenia pedunculata Raeusch, of St. Croix, has not been identified by recent botanists.

Eugenia paniculata Bello, described as Porto Rican by Bello and by Stahl, has not been identified by recent botanists. Urban suggested relationship with *E. Eggersii* Kiaersk.

Eugenia lineata DC., a species of Santo Domingo, was recorded by Krebs as found in St. Thomas, evidently in error.

Eugenia Dombeyana DC., Peruvian, sent by the Bureau of Plant Industry to the Insular Experiment Station, Rio Piedras, in 1923, had formed a vigorous plant 6 dm. high in February, 1924; it is a shrub or small tree, with oblong leaves canescent beneath.

9. **JAMBOS** Adans. Fam. Pl. 2: 564. 1763.

Trees, with coriaceous, pinnately veined, punctate opposite leaves, and mostly large corymbose or paniculate flowers, terminal, or lateral on the branches. Calyx obconic or turbinate, 4–8-lobed. Petals as many as the calyx-lobes. Stamens many, much longer than the petals. Ovary sessile, 2–3-celled; ovules numerous. Fruit a large berry crowned by the calyx-lobes. Radicle of the embryo short, much shorter than the cotyledons. [Malabar name.] Fifty species or more, natives of the Old World tropics, the following typical.

1. **Jambos Jambos** (L.) Millsp. Field Mus. Bot. 2: 80. 1900.

Eugenia Jambos L. Sp. Pl. 470. 1753.

Jambosa vulgaris DC. Prodr. 3: 286. 1828.

A tree, up to about 10 m. high, glabrous throughout. Leaves lanceolate or oblong-lanceolate, subcoriaceous, 10–20 cm. long, bright green, rather dull, pinnately and finely reticulate-veined, the apex acuminate, the base narrowed, the stout petioles 5–9 mm. long; flowers few, large, corymbose, terminal; pedicels stout, about 1 cm. long; calyx-tube turbinate, about 1 cm. long, the lobes broad, rounded; petals coarsely punctate, 1–1.5 cm. long; stamens 3–4 cm. long, white; fruit 2–4 cm. in diameter.

Thickets and woodlands, Porto Rico, abundant, especially along streams; St. Croix; St. Thomas; St. Jan; Tortola:—widely naturalized in the West Indies and in tropical continental America. Native of tropical Asia. POMA ROSA. POMME ROSE. ROSE APPLE.

Jambos malaccensis (L.) DC., MALAY APPLE, Asiatic, occasionally planted for its fruit in Porto Rico and the Virgin Islands, is a tall tree, with large obovate or oblong-obovate, acute or acuminate petioled leaves, the purple flowers in short lateral racemes, the edible crimson turbinate fruit about 7 cm. long. It was recorded by Eggers as formerly naturalized in shaded valleys on St. Croix. Two fine trees about 12 meters high were seen at Happy Hollow, Porto Rico, in 1924. [*Eugenia malaccensis* L.]

10. **ANAMOMIS** Griseb. Fl. Br. W. I. 240. 1860.

Evergreen aromatic trees or shrubs, with opposite coriaceous leaves and axillary peduncled flowers, in cymes or solitary, when in cymes the central flowers sessile or stalked. Calyx-lobes 4 or 5. Petals 4 or 5. Stamens many, with filiform filaments and short anthers. Ovary 2-celled or 4-celled, about as long as the calyx-tube; ovules several in each cavity; style slender or filiform. Berry oval or subglobose, 1–several-seeded, crowned by the calyx-lobes. Radicle

shorter than the cotyledons. [Greek, like *Amomis*.] About 8 species, natives of the West Indies and Florida. Type species: *Ananomis fragrans* (Sw.) Griseb.

1. **Ananomis fragrans** (Sw.) Griseb. Fl. Br. W. I. 240. 1860.

Myrtus fragrans Sw. Prodr. 79. 1788.

Eugenia punctata Vahl in West, St. Croix 289. 1795.

Eugenia fragrans Willd. Sp. Fl. 2: 964. 1800.

Ananomis punctata Griseb. Fl. Br. W. I. 240. 1860.

Eugenia fragrans fajardensis Krug & Urban, Bot. Jahrb. 19: 665. 1895.

An aromatic shrub or a small tree up to about 10 m. high, the young twigs pubescent or glabrate, slender. Leaves elliptic to obovate, coriaceous, 2–5 cm. long, strongly punctate, glabrous, shining, the apex obtuse or acutish, the base mostly narrowed, the venation delicate, the petioles 4–7 mm. long; peduncles as long as the leaves or shorter; cymes commonly bifid, the branches 3-flowered; sepals 4, rarely 5, rounded, about 2 mm. long; petals white, rounded, about 2 mm. long. [*Myrtus emarginata* of Sessé & Mocino, not of Kunth.]

Coastal thickets, Fajardo, Porto Rico; Mona; Vieques;—Cuba; Hispaniola;—St. Croix; St. Jan; Tortola;—Jamaica; St. Martin; St. Kitts; Antigua; Guadeloupe. The Fajardo plant was described from barren specimens.

Ananomis umbellilifera (H.B.K.) Britton, CIRUELAS, occasionally cultivated in Porto Rico for its fruits, is a tree, with elliptic nearly sessile leaves obtuse at both ends, coriaceous and reticulate-veined, the 5-parted flowers white, the stamens very numerous, the berries 1–1.5 cm. in diameter. [*Myrtus umbellilifera* H.B.K.; *Myrcia* (?) *umbellilifera* DC.; *Eugenia esculenta* Berg; *Myrcianthes Krugii* Kiaersk.] It is native of Hispaniola.

Pimenta Pimenta (L.) Cockerell, ALLSPICE, PIMENTA, Jamaican, occasionally planted in Porto Rico and the Virgin Islands, is a smooth-barked aromatic tree, with coriaceous, oblong or elliptic, obtuse leaves 7–17 cm. long, and small, 4-parted, white flowers in axillary peduncled cymes, the berry-like subglobose fruits about 6 mm. long. [*Myrtus Pimenta* L.; *Pimenta vulgaris* Lindl.; *Eugenia Pimenta* DC.]

Syzygium jambolanum (Lam.) DC., JAVA PLUM, JAMBOLAN, of southwestern Asia, grown at the Botanical Station, Road Town, Tortola, is a tree 10–15 m. high, with evergreen oval, closely veined, slender-petioled leaves 7–15 cm. long, not glandular-punctate, the small white flowers in paniced cymes, the petals cohering, the edible berries 1–2 cm. long. [*Eugenia jambolana* Lam.]

Species of the Australasian genus **Eucalyptus**, AUSTRALIAN GUMS, have been planted in Porto Rico and the Virgin Islands experimentally for forest and fuel purposes and as roadside trees, many of them of rapid growth and attaining great height. They have coriaceous entire leaves and rather large axillary flowers, the calyx-tube with a lid. Observations and records at the Mayaguez Agricultural Experiment Station and at the Forest Station at Rio Piedras show that the following species succeed best in Porto Rico; a number of others have been grown.

Eucalyptus robusta Smith.

Eucalyptus rostrata Schl.

Eucalyptus citriodora Hook.

Eucalyptus tereticornis Smith.

Eucalyptus viminalis Labill.

Eucalyptus resinifera Smith.

Eucalyptus paniculata Smith.

Myrtus communis L., MYRTLE, SWEET MYRTLE, European, is a shrub, occasionally planted for ornament in Porto Rico and the Virgin Islands. It has oblong to lanceolate, acute aromatic, nearly sessile leaves 6 cm. long or less, the slender-peduncled flowers solitary in the axils, the fruit a small black berry.

Myrtus salutaria H.B.K., recorded by Krebs as found in St. Thomas prior to 1851, is presumably an error in determination. Urban suggested that the record might apply to *M. communis*, but Krebs has that also in his list.

Couroupita guianensis Aubl., CANNON-BALL TREE, native of Trinidad and northern South America, planted occasionally in Porto Rico and the Virgin Islands, belongs to the related Family **Lecythidaceae**. It is a large tree, 15 m. high or higher, the gray bark slightly fissured, with large alternate oblong leaves, the showy flowers borne on the trunk, with a turbinate calyx and 6 unequal petals, the stamens in many series. The large globose fruit is woody and malodorous.

Family 6. **RHIZOPHORACEAE** Lindl.

MANGROVE FAMILY.

Shrubs or trees, with terete branches and usually glabrous foliage. Leaves usually opposite, leathery, with stipules. Flowers perfect, solitary in the axils or in spikes, racemes, cymes or panicles. Calyx with 3 or 4 valvate sepals. Petals as many as the sepals, 2-cleft or lacerate. Stamens twice or four times as many as the petals, or rarely of the same number, inserted at the base of a disk; filaments short or elongated; anthers 2-celled, opening lengthwise. Ovary inferior, or partly inferior, usually 3-5-celled or rarely 1-celled; styles united; stigmas sometimes lobed. Ovules 2 or rarely 4 or more in each cavity; pendulous. Fruit leathery, crowned with the calyx, indehiscent or tardily septical. The family consists of about 15 genera, containing some 50 species, natives of tropical and subtropical regions.

Calyx 4-parted; fruit 1-seeded.
Calyx campanulate, 4-5-cleft; fruit 3-seeded.

1. *Rhizophora*.
2. *Cassipourea*.

1. **RHIZOPHORA** L. Sp. Pl. 443. 1753.

Evergreen trees, with an astringent bark, and stout pithy twigs. Leaves opposite, entire; stipules elongated, interpetiolar, caducous. Flowers cream-colored or yellow, 2 or several on forking peduncles. Calyx-tube short, adnate to the base of the ovary, the 4 lobes leathery. Petals 4, emarginate, leathery. Stamens 4-12, alternate with the petals; filaments short. Ovary 2-celled, half-inferior, produced into a fleshy cone. Stigma 2-lobed. Ovules 2 in each cavity. Fruit pendulous, 1-celled, leathery. Seed solitary, germinating in the persistent fruit, the elongating radicle sometimes reaching the ground before the fruit falls. Endosperm wanting. [Greek, root-bearing.] Three known species, the following typical, the others natives of the Old World tropics.

1. **Rhizophora Mangle** L. Sp. Pl. 443. 1753.

A shrub or tree, reaching a height of 10 m. or more, forming impenetrable thickets by the greatly elongating radicles of the embryo, and the numerous roots. Leaves 5-15 cm. long, leathery, elliptic or elliptic-obovate, obtuse, with a stout midrib; petioles 0.5-1.5 cm. in length; peduncles 1-4 cm. long, 2-3-flowered; pedicels stout, 5-10 mm. long; bractlets scale-like; calyx-tube fleshy, turbinate or campanulate, the lobes 3-5 mm. long; sepals lanceolate, about 1 cm. long, involute, keeled within, very firm, recurved at maturity; petals pale yellow, linear or nearly so, cleft at the tip, involute above the middle, cobwebby

along the edges; anthers clustered around the style; fruit 2–3 cm. long, curved, the radicle protruding as a narrowly clavate pendent body.

Coastal swamps, Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Anegada:—Florida; Bermuda; West Indies; continental tropical America and tropical Africa. The hard and strong brown wood, valued for piling posts, and in boat-building, has a specific gravity of about 1.16; the furrowed gray bark is much used in tanning. MANGLE COLORADO. MANGLE SAPATERO. MANGROVE.

2. *CASSIPOUREA* Aubl. Pl. Guian 1: 528. 1775.

Glabrous trees or shrubs, with opposite petioled leaves, the short interpetiolar stipules caducous, the small flowers fascicled or solitary in the axils. Calyx campanulate, 4–5-lobed, the lobes valvate. Petals 4 or 5, clawed, lacerate. Disk cupulate, crenulate. Stamens 10–30; filaments filiform; anthers short. Ovary 3–4-celled; style filiform; stigma slightly 3–4-lobed. Fruit somewhat fleshy, 3–4-seeded. Seeds pendulous, arillate. [Guiana name.] About 8 species, of tropical America. Type species: *Cassipourea guianensis* Aubl.

1. *Cassipourea alba* Griseb. Goett. Abh. 7: 223. 1857.

A shrub, or a tree up to about 10 m. in height, the twigs slender. Leaves chartaceous, oblong to elliptic, delicately pinnately veined, with the veins anastomosing, 5–10 cm. long, entire, the apex acute or acuminate, the base narrowed or obtuse, the petioles 5–10 mm. long; pedicels few or solitary in the axils, about 6 mm. long or less; calyx 4–6 mm. long, mostly 4-lobed; petals white, hairy, about twice as long as the calyx; stamens 10–16; style strigose; fruit oblong or subglobose, greenish, puberulent, 6–10 mm. long. [*Legnotis elliptica* of Sprengel, not of Swartz; *Cassipourea elliptica* of Bello and of Stahl, not of Poiret.]

Thickets, wooded hills and forests, Porto Rico, at lower and middle elevations in wet and moist districts:—Guadeloupe to Trinidad. PALO DE GONGOLI. PALO DE TORO. PALO DE OREJA.

Family 7. ONAGRACEAE Dumort.

EVENING-PRIMROSE FAMILY.

Herbs, or rarely shrubs, with alternate or opposite leaves, no stipules, or mere glands in their places, and generally perfect flowers. Calyx-tube adnate to the ovary, the limb 2–6-lobed (usually 4-lobed). Petals 2–9 (usually 4), convolute in the bud, rarely none. Stamens usually as many or twice as many as the petals. Ovary 1–6-celled (usually 4-celled); styles united; stigma capitate, discoid or 4-lobed; ovules generally anatropous. Fruit a capsule or small nut. Endosperm very little or none. Forty genera and about 350 species of wide geographic distribution, most abundant in America.

Stamens 4.
Stamens 8–12 in 2 series.

1. *Isnardia*.
2. *Jussiaea*.

1. *ISNARDIA* L. Sp. Pl. 120. 1753.

Succulent herbs. Stems creeping or floating; leaves opposite, relatively few, petioled. Flowers axillary, sessile, not yellow. Calyx-segments 4, shorter than the tube or slightly longer. Filaments very short. Ovary very short; styles often almost wanting. Capsule obovoid or turbinate, straight. [In honor of Antoine Dante Isnard, a French botanist, and a member of the Academy of

Sciences, died 1724.] About 4 species in North America, Mexico and the West Indies. Type species: *Isnardia palustris* L.

1. *Isnardia palustris* L. Sp. Pl. 120. 1753.

Stems branching, 1–5 dm. long; leaves oval, ovate or spatulate, 12–25 mm. long, narrowed into slender petioles; flowers solitary, about 2 mm. broad; bractlets at base of the calyx usually none; calyx-lobes triangular, acute, petals small, reddish, or often wanting; capsule 4-sided, slightly longer than wide, about 3 mm. high, slightly exceeding the calyx-lobes.

Clearing in wet woods, Sardinera, near Dorado, Porto Rico, 1922:—north temperate zone, extending south in America to Mexico; Bermuda; Hispaniola. MARSH PURSIANE.

2. *JUSSIAEA* L. Sp. Pl. 388. 1753.

Perennial herbs, some species woody, with alternate, mostly entire leaves and solitary axillary flowers, the petals usually yellow. Calyx-tube cylindric or prismatic, not prolonged beyond the ovary, the limb 4–6-parted, its lobes persistent. Petals 4–6, mostly longer than the calyx-lobes. Stamens 8–12, in 2 series. Ovary 4–6-celled. Capsule narrowly cylindric, prismatic or clavate, ribbed, the pericarp deteriorating. Seeds numerous and minute. [In honor of Bernard de Jussieu, 1699–1777, eminent French botanist and physician.] About 50 species, of tropical distribution, mostly American, known as PRIMROSE WILLOW and YERBA DE CLAVO. Type species: *Jussiaea repens* L.

Seeds in one row in each cavity of the capsule.

Plant creeping, rooting at the nodes.

Plant erect or ascending.

Seeds in several rows in each cavity of the capsule.

Capsule short, obpyramidal or tetragonal.

Capsule tetragonal, linear, sessile or nearly so; plant glabrous, slender.

Capsule obpyramidal, stalked; plant stout, hirsute.

Capsule subcylindric, elongated.

1. *J. repens*.

2. *J. leptocarpa*.

3. *J. erecta*.

4. *J. peruviana*.

5. *J. angustifolia*.

1. *Jussiaea repens* L. Sp. Pl. 388. 1753.

Jussiaea Swartziana DC. Prodr. 3: 54. 1828.

Glabrous, aquatic or uliginous; stem rooting at the lower nodes, floating or ascending, little branched or simple, 2–10 dm. long. Leaves petioled, oval to oblong or spatulate, 2–8 cm. long, the apex obtuse, acutish or rounded, the base narrowed; peduncles slender, 0.5–3 cm. long; calyx-lobes 5, lanceolate, acute, shorter than the petals; petals obovate, 6–10 mm. long; capsule subcylindric, narrowed below, 1.5–3 cm. long, the seeds in one row in each cavity.

In shallow water, along borders of lakes and streams, Porto Rico:—Jamaica; Cuba; Hispaniola; continental warm-temperate and tropical America and Old World tropics.

2. *Jussiaea leptocarpa* Nutt. Gen. 1: 279. 1818.

Jussiaea variabilis Meyer, Fl. Esseq. 174. 1818.

Jussiaea pilosa H.B.K. Nov. Gen. 6: 101. 1823.

Jussiaea affinis DC. Prodr. 3: 53. 1828.

Bushy, erect or ascending, branched, 3–20 dm. high. Leaves oblong to lanceolate or oblong-lanceolate, short-petioled or sessile, 2–10 cm. long, the apex blunt or acute, the base narrowed; flowers short-peduncled or sessile; calyx-lobes 4–6, lanceolate, acuminate, about 6 mm. long; petals obovate, little longer than the calyx-lobes; capsule subcylindric, narrowed below, 2–3 cm. long, the

seeds in one row in each cavity. [? *J. pubescens* L.; *J. Swartziana* of Bello, not of de Candolle; *J. palustris* of Stahl, not of Meyer.]

Marshes and ditches, Porto Rico, at lower elevations:—southeastern United States; Jamaica; Cuba; Hispaniola; Guadeloupe to Trinidad; continental tropical America; tropical Africa. All Porto Rico specimens seen are glabrous, but many from other regions are pilose.

3. *Jussiaea erecta* L. Sp. Pl. 388. 1753.

Jussiaea acuminata Sw. Fl. Ind. Occ. 745. 1800.

Jussiaea Plumeriana Bello, Anal. Soc. Esp. Hist. Nat. 10: 267. 1881.

Glabrous, erect, slender and with slender ascending branches, 5–15 dm. high. Leaves lanceolate to linear-lanceolate, short-petioled, 2–8 cm. long, the apex acuminate, the base narrowed; flowers sessile; calyx-lobes 4, lanceolate or ovate-lanceolate, 2.5–4 mm. long; petals spatulate, about as long as the calyx-lobes; capsule somewhat angled, splitting, 1.5–2 cm. long; seeds in several rows.

Wet grassy situations at lower elevations, Porto Rico; Vieques; St. Croix (according to West); St. Thomas (according to Krebs); Tortola:—Florida; Jamaica; Cuba; Hispaniola; Antigua to Trinidad; continental tropical America; tropical Africa. YERBA DE JICOTEA.

4. *Jussiaea peruviana* L. Sp. Pl. 388. 1753.

Oenothera hirta L. Syst. ed. 10, 998. 1759.

Jussiaea hirta Vahl, Eclog. 2: 31. 1798.

Hirsute-pubescent, stout, erect, branched, 2.5 m. high or less. Leaves oblong or oblong-lanceolate, short-petioled, 5–10 cm. long, strongly veined, pubescent on both sides, the apex acuminate, the base narrowed or cuneate; flowers peduncled, large and showy, the peduncles rather stout, villous, 1–4 cm. long; calyx-lobes 4, ovate, acuminate, pubescent, 8–12 mm. long; petals obovate, longer than the calyx-lobes; capsule tetragonal, obpyramidal, pubescent, 1.5–2.5 cm. long; seeds in several rows in each cavity.

Wet or moist open situations, Porto Rico, at lower and middle elevations:—Florida; Jamaica; Cuba; Hispaniola; Trinidad; continental tropical America.

5. *Jussiaea angustifolia* Lam. Encycl. 3: 331. 1789.

? *Jussiaea octavalvis* Sw. Obs. 142. 1791.

Jussiaea octonervia Lam. Encycl. 3: 332. 1789.

Jussiaea octofila DC. Prodr. 3: 57. 1828.

Jussiaea suffruticosa angustifolia Kuntze, Rev. Gen. Pl. 251. 1891.

Jussiaea suffruticosa Sintenisii Urban, Symb. Ant. 4: 469. 1910.

Jussiaea suffruticosa ligustrifolia Eggers, Bull. U. S. Nat. Mus. 13: 54. 1879.

Erect, 6–10 dm. high, somewhat branched, more or less pubescent, at least above. Leaves linear to oblong-lanceolate, entire, short-petioled, 2.5–10 cm. long, acute at the apex, narrowed at the base; peduncles mostly not longer than the petioles; calyx-lobes 4, rarely 5, lanceolate or ovate-lanceolate, acute or acuminate, 6–12 mm. long; petals obovate, bright yellow, mostly 2–3 times as long as the calyx-lobes; capsule 3–6 cm. long, subcylindric, tapering to the base; seeds in several rows in each cavity. [*J. suffruticosa* of de Candolle and subsequent authors, not of Linnaeus; *J. acuminata* of Stahl and perhaps of Krebs, not of Swartz; *J. linifolia* of Cook and Collins.]

Wet or moist open situations, Porto Rico, at lower and middle elevations; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—southeastern United States; West Indies; continental tropical America and Old World tropics.

Jussiaea dodecandra DC., a species of northern South America, was recorded by Krebs as found in St. Thomas, presumably in error.

Order 25. AMMIALES.

Herbs, shrubs or trees, almost always with petaliferous flowers. Calyx-segments and petals usually 5. Stamens 4 or 5. Ovary inferior, adnate to the calyx, compound; ovules 1 in each cavity.

Fruit a berry or drupe.
Fruit dry when mature, splitting into two mericarps.

Fam. 1. ARALIACEAE.
Fam. 2. AMMIACEAE.

Family 1. ARALIACEAE Vent.

GINSENG FAMILY.

Herbs, shrubs or trees, with alternate or verticillate (rarely opposite) leaves, and small flowers in umbels, heads, or panicles. Calyx-tube adnate to the ovary. Petals usually 5, sometimes cohering together, inserted on the margin of the calyx. Stamens as many as the petals and alternate with them (rarely more), inserted on the epigynous disk; anthers introrse. Ovary inferior, 1-several-celled; styles as many as the cavities of the ovary; ovules 1 in each cavity, pendulous, anatropous. Fruit fleshy. Seeds flattened, or somewhat 3-angled, the testa thin; endosperm copious, fleshy; embryo small, near the hilum; cotyledons ovate to oblong. About 52 genera and 450 species, widely distributed, the Porto Rico and Virgin Island species trees.

Leaves simple; styles 5 or 6, connate.
Leaves digitately compound; styles 2, distinct.

1. *Dendropanax*.
2. *Didymopanax*.

1. *DENDROPANAX* Dcne. & Pl. Rev. Hort. 4³: 107. 1854.

Glabrous trees or shrubs, with simple, entire, or in a few species lobed, mostly pinnately veined leaves, the umbels racemose, panicled, subumbellate or solitary. Calyx 5-toothed or nearly truncate. Petals 5, valvate. Stamens 5, the anthers ovate or oblong. Ovary 5-celled; styles connate. Fruit globose or ovoid, usually 5-grooved, the exocarp fleshy. [Greek, tree-*Panax*.] About 20 species, natives of warm and tropical regions of America and Asia. Type species: *Aralia arborea* L.

Umbels racemose, their peduncles ebracteolate, or 1-2-bracteolate.
Umbels subumbellate, their peduncles 3-4-bracteolate at about the middle.

1. *D. arboreum*.
2. *D. laurifolium*.

1. *Dendropanax arboreum* (L.) Dcne. & Pl. Rev. Hort. 4³: 107. 1854.

Aralia arborea L. Syst. ed. 10, 967. 1759.

Hedera arborea Sw. Fl. Ind. Occ. 518. 1797.

Sciadophyllum Jacquini Griseb. Fl. Br. W. I. 306. 1860.

Gilibertia arborea E. March.; Durand & Pittier, Bull. Soc. Bot. Belg. 30: 281. 1891.

A tree, 8-20 m. high, or sometimes shrubby, the twigs rather stout. Leaves ovate to elliptic or some of them obovate, subchartaceous, entire, 8-20 cm. long, loosely reticulate-veined and green on both sides, the apex acute or acuminate, the base narrowed, obtuse or rounded, the slender unequal petioles 2-10 cm. long; inflorescence a raceme of peduncled umbels often as long as the leaves; peduncles slender, naked, or with 1 or 2 bractlets, 1-3 cm. long; umbels 20 or fewer, several-many-flowered, 1.5-2 cm. broad when in flower; calyx about 2 mm. broad, rather sharply 5-toothed; petals white, about 1.5 mm. long; fruit black, subglobose, grooved, 6-8 mm. in diameter. [*Scidophyllum capitatum* of Eggers, not of Grisebach.]

Forests and wooded hills, Porto Rico, mostly at middle and higher elevations in wet or moist districts; St. Thomas; Tortola:—Jamaica; Cuba; Hispaniola; St. Vincent; Trinidad; Margarita; continental tropical America. The light yellow wood is hard, heavy, strong and tough. MUÑECA. PALO CACHUMBA. VIBONA.

2. **Dendropanax laurifolium** (E. March.) Dcne. & Pl.; R. C. Schneider, Bull. Torr. Club 36: 644. 1909.

Gilibertia laurifolia E. March.; Urban, Symb. Ant. 1: 203. 1899.

A tree, up to 20 m. in height, with rather stout gray twigs. Leaves obovate to oblong or elliptic, chartaceous, entire or slightly undulate, 8–22 cm. long, densely reticulate-veined and green on both sides, the apex short-acuminate, the base rounded, obtuse or narrowed, the slender unequal petioles 1–12 cm. long; umbels subumbellate, many-flowered; peduncles 4 cm. long or shorter, with a whorl of 3 or 4 bractlets at or above the middle; calyx-limb undulate; petals yellowish or greenish white, about 1.5 mm. long; fruit subglobose or globose-ovoid, 5–6 mm. in diameter. [*Sciadophyllum capitatum* of Bello and of Stahl, not of Grisebach, *Oreopanax capitatum* of Cook and Collins.]

Forests at middle and higher elevations in wet or moist districts of Porto Rico. Endemic. The wood is heavy, strong and tough. PALO DE GANGULIN. PALO DE VACA.

2. **DIDYMOPANAX** Dcne. & Pl. Rev. Hort. 4³: 109. 1854.

Trees, with digitately compound petioled leaves, the twigs, under leaf-surfaces and inflorescence finely stellate-puberulent or tomentulose, the flowers in paniced umbels. Calyx 5-toothed. Petals 5, valvate. Stamens 5, with short filaments and ovate anthers. Ovary 2-celled; styles 2, distinct. Fruit compressed, didymous, the exocarp slightly fleshy. [Greek, didymous-*Panax*.] About 20 species, natives of tropical America. Type species: *Panax Morototoni* Aubl.

1. **Didymopanax Morototoni** (Aubl.) Dcne. & Pl. Rev. Hort. IV. 3: 109. 1854.

Panax Morototoni Aubl. Pl. Guian 2: 949. 1775.

Panax speciosum Willd. Sp. Pl. 4: 1126. 1806.

Didymopanax chrysophyllum Dcne. & Pl. Rev. Hort. IV. 3: 109. 1854.

A tree, up to 25 m. in height, the bark smooth, the pith of branches large, the straight trunk annulate, branched above. Leaves clustered at the ends of the branches; petioles stout, terete, 3–6 dm. long; leaflets 7–10, their petioles 3–10 cm. long; blades elliptic, oblong or oblong-obovate, 2–4 dm. long, acuminate, strongly pinnately few-veined, often subcordate, those of young plants membranous, pubescent, sometimes serrulate, those of mature tree chartaceous, glabrous above, densely pale-tomentulose beneath, entire or repand; panicles compound, 2–6 dm. long, tomentulose when young, the umbels very numerous; pedicels 2–6 mm. long, calyx about 2 mm. long; petals white, about 2 mm. long; fruit glaucous, 6–7 mm. broad, 4–5 mm. long, about 2 mm. thick.

Mountain forests of Porto Rico; St. Thomas; St. Jan:—Cuba; Hispaniola; Guadeloupe; Trinidad; northern South America. The hard and heavy nearly white wood is used in construction; it is fine-grained and brittle. Leaves of juvenile trees have been referred by Urban to *Didymopanax micans* (H. & B.) Krug and Urban [*Aralia micans* H. & B.], originally from Colombia. LLAGRUME.

Polyscias Guilfoylei (Bull) Bailey, GALLEGO, of the South Sea islands, planted for its ornamental foliage in Porto Rico and Virgin Island gardens, is a small tree or shrub up to about 5 m. high, the leaves pinnate, the leaflets various, ovate in outline, dentate or pinnatifid, often white-margined. [*Aralia Guilfoylei* Bull.]

Polyscias filicifolia (Moore) Bailey, also of the South Sea islands and grown for ornament in Porto Rico and the Virgin Islands, has leaves very diverse on individual plants, some of the leaflets ovate and dentate, others pinnatifid into linear lobes or segments. [*Aralia filicifolia* Moore.]

Hedera Helix L., EUROPEAN IVY, European, seen in Mr. Fairchild's garden, Louisenhøj, St. Thomas, in 1922, is an evergreen vine, climbing on trees or walls by aerial roots, the dark green, thick leaves variously lobed, the yellow-green flowers in peduncled umbels.

Family 2. AMMIACEAE Presl.

CARROT FAMILY.

Herbs, with alternate compound or sometimes simple leaves, the petioles often dilated at the base. Stipules none, or rarely present and minute. Flowers small, generally in compound or simple umbels, rarely in heads or capitate clusters, often polygamous. Umbels and umbellets commonly involucrate or involucellate. Calyx-tube adnate to the ovary, its margin truncate or 5-toothed, the teeth seldom conspicuous. Petals 5, inserted on the margin of the calyx, usually with an inflexed tip, often emarginate or 2-lobed, those of the outer flowers sometimes larger than those of the inner. Stamens 5, inserted on the epigynous disk; filaments filiform; anthers versatile. Ovary inferior, 2-celled; styles 2, filiform, persistent, often borne on a conic or depressed stylopodium; ovules 1 in each cavity, pendulous, anatropous. Fruit dry, composed of 2 carpels (mericarps), which generally separate from each other at maturity along the plane of their contiguous faces (the commissure). Fruit either flattened laterally (at right angles to the commissure), or dorsally (parallel to the commissure), or nearly terete (not flattened). Carpels after parting from each other supported on the summit of a slender axis (the carpophore), each with 5 primary ribs in their pericarps (rarely ribless), and in some genera with 4 additional secondary ones, the ribs or some of them often winged. Pericarp membranous or corky-thickened, usually containing oil-tubes between the ribs, or under the ribs and on the commissural side, sometimes irregularly scattered, sometimes none. Seeds 1 in each carpel, usually adnate to the pericarp; seed-coat thin; endosperm cartilaginous; embryo small, placed near the hilum; cotyledons ovate, oblong or linear. About 170 genera and 1600 species, of wide distribution. The mature fruit is necessary for the certain determination of most of the genera and many of the species.

Leaves simple.

A dichotomously branched herb, with oblanceolate or spatulate-oblanceolate leaves, serrate with bristle-tipped teeth.

Herbs with creeping stems, rooting at the nodes; leaves ovate to orbicular, without bristle-tipped teeth; flowers umbellate.

Fruit without secondary ribs or reticulations; leaves 1 at a node.

Fruit with secondary ribs and reticulations; leaves several at the nodes.

Leaves compound or dissected.

Umbels sessile along the stem; the umbellets stalked; flowers white.

Umbels distinctly stalked, terminal; flowers yellow.

1. *Eryngium*.

2. *Hydrocotyle*.

3. *Centella*.

4. *Cyclospermum*.

5. *Anethum*.

1. ERYNGIUM [Tourn.] L. Sp. Pl. 232. 1753.

Herbs, with spiny-toothed lobed dentate or sometimes dissected, rarely entire, leaves, and bracted heads or spikes of small white or blue flowers subtended by bractlets. Calyx-teeth rigid, pungent, or acute. Petals erect. Disk expanded.

Fruit scaly or tuberculate, somewhat flattened laterally. Carpels nearly terete, their ribs obsolete or none, the oil-tubes usually 5. [Greek, a kind of thistle.] About 150 species, of wide distribution. Type species: *Eryngium maritimum* L.

1. *Eryngium foetidum* L. Sp. Pl. 232. 1753.

A diffuse, dichotomously branched, glabrous, ill-smelling herb. Basal leaves spatulate-oblongate or oblong-oblongate, 5–18 cm. long, 1.5–5 cm. broad, sheathing at the base, serrate with bristle-tipped teeth; involucral leaves much longer than the flower heads, usually deeply spinescent-serrate; flower heads cylindric-ovoid, 0.5–1.3 cm. long, 4–5 mm. thick, long-peduncled; flowers white.

Waste and cultivated grounds, Porto Rico; St. Thomas (according to Eggers):—Jamaica; Cuba; Hispaniola; St. Martin to Trinidad; continental tropical America. CULANTRO DEL MONTE. FIT-WEED.

2. *HYDROCOTYLE* [Tourn.] L. Sp. Pl. 234. 1753.

Perennial herbs, prostrate and commonly rooting at the joints, with palmately lobed or veined, often peltate leaves, the bases of the petioles with 2 scale-like stipules, and small white flowers in umbels opposite the leaves. Bracts of the involucre few, or none. Calyx-teeth minute. Petals entire. Disk flat. Fruit laterally compressed, orbicular or broader than high. Carpels with 5 primary ribs, the lateral ones usually curved; no large oil-tubes but an oil-bearing layer of tissue beneath the epidermis. [Greek, water-cup.] About 75 species, of wide distribution. Type species: *Hydrocotyle vulgaris* L. The plants are known as YERBA DE CUARTO and MARSH PENNYWORT.

Leaf-blade peltate, glabrous or with scattered hairs on both sides.

Umbel simple (rarely producing a second umbel); fruit notched at the base.

Delicate herb with filiform stems; umbel few-flowered, the pedicels very short; fruit not strongly ribbed.

More robust; umbel many-flowered, the pedicels often 1 cm. or more long; fruit strongly ribbed.

Umbels proliferous; fruit rounded or truncate at the base.

Leaf-blades not peltate, villous on both sides; inflorescence spicate.

1. *H. pusilla*.

2. *H. umbellata*.

3. *H. verticillata*.

4. *H. hirsuta*.

1. *Hydrocotyle pusilla* A. Rich. Ann. Sci. Phys. 4: 167. 1820.

A rather delicate herb, with slender often filiform stems. Leaf-blades orbicular, peltate, 0.5–1.6 cm. broad, glabrous or with scattered hairs on both surfaces, crenate; petioles 1–3 cm. long, slender, often pilose; peduncles filiform, as long as or shorter than the petioles; umbel few-flowered; fruit sessile or nearly so, 1 mm. long, 1.2–1.5 mm. broad, notched at the base.

Wet mossy banks at middle and higher elevations, Porto Rico:—Hispaniola; South America.

2. *Hydrocotyle umbellata* L. Sp. Pl. 234. 1753.

A glabrous herb. Leaf-blades orbicular, peltate, 1.5–5 cm. long; umbel simple, rarely producing a second umbel; verticels usually many-flowered; peduncles often as long as the leaves; fruit about 1.8–2 mm. long, 2–2.7 mm. broad, notched at the base and apex.

Wet open grounds at lower elevations, Porto Rico:—eastern and southern United States; Jamaica; Cuba; Hispaniola; Guadeloupe; continental tropical America; tropical Africa.

3. *Hydrocotyle verticillata* Thunb. Diss. Hydrocot. 5. 1798.*Hydrocotyle interrupta* Muhl. Cat. 10. 1813.*Hydrocotyle verticillata longipedunculata* Urban in Mart. Fl. Bras. 11¹: 268. 1879.

A glabrous herb. Leaf-blades orbicular, peltate, 1–7 cm. broad, crenate or crenate-lobed, long-petioled; umbels proliferous, 2–5 cm. long; verticels 2–several-flowered; peduncles as long as the petioles or longer; pedicels usually less than 3 mm. long; fruit about 2 mm. long, 3–4 mm. broad, rounded or truncate at each end.

Moist soil and river-flats, abundant along the Coamo River:—eastern and southern United States; Bermuda; Bahamas; Jamaica; Cuba; Hispaniola; Guadeloupe; continental tropical America; south Africa.

4. *Hydrocotyle hirsuta* Sw. Prodr. 54. 1788.*Hydrocotyle spicata* Lam. Encycl. 3: 153. 1789.*Hydrocotyle hirsuta spicata* Urban in Mart. Fl. Bras. 11¹: 282. 1879.*Hydrocotyle hirsuta leptostachya* Urban in Mart. Fl. Bras. 11¹: 282. 1879.

Stems slender, glabrous or nearly so, 0.5–3 dm. or more long. Petioles villous, 1–10 cm. long; leaf-blades suborbicular or reniform, 1–3 cm. broad, crenate, rather deeply cordate, villous on both sides, densely so beneath; spikes peduncled, interrupted, usually longer than the leaves, the peduncles and rachis villous; fruits sessile, glabrous, emarginate at base and apex, about 1.5 mm. broad.

Wet or moist banks and rocks, Porto Rico, at lower and middle elevations:—Bahamas; Cuba; Hispaniola; Curaçao; Brazil.

3. **CENTELLA** L. Sp. Pl. ed. 2, 1393. 1763.

Perennial herbs (some African species shrubby), ours with prostrate stems rooting and sending up tufts of petioled leaves at the nodes, together with 1–3 long-rayed umbellets of small white flowers, the true umbel sessile. Petiole-bases sheathing. Bracts of the involucels 2–4, mostly prominent. Calyx-teeth none. Disk flat, or slightly concave. Styles filiform. Fruit somewhat flattened laterally, rather prominently ribbed, the ribs mostly anastomosing; oil-tubes none. [Latin, diminutive of centrum, a prickle.] About 20 species, of wide distribution, abundant in South Africa. Type species: *Centella villosa* L.

1. *Centella asiatica* (L.) Urban in Mart. Fl. Bras. 11¹: 287. 1879.*Hydrocotyle asiatica* L. Sp. Pl. 234. 1753.*Hydrocotyle repanda* Pers. Syn. 1: 302. 1805.*Centella repanda* Small, Fl. SE. U. S. 859. 1903.

Stem 2–15 cm. or more long. Petioles 0.3–3 dm. long, sometimes pubescent; blades ovate to orbicular-ovate, rather thick, rounded at the apex, broadly cordate or nearly truncate at the base, not peltate, 2–7 cm. long, repand-dentate; pedicels much shorter than the leaves, 1–7 cm. long; umbellets capitate, 2–4-flowered, subtended by 2 ovate bracts; flowers nearly sessile; fruit 4–5 mm. broad, about 3 mm. high, prominently ribbed and reticulated.

Wet or moist grassy situations, Porto Rico, at lower and middle elevations:—southeastern United States; Bermuda; Bahamas; Jamaica; Cuba; Hispaniola; Guadeloupe; Martinique; Trinidad; continental tropical America; Old World tropics and subtropics. YERBA DE CLAVO.

4. **CYCLOSPERMUM** Lag. Amen. Nat. 1²: 101. 1821.

Herbs, with decomposed or dissected leaves and compound umbels of small white flowers mostly opposite the leaves. Involucre and involucels wanting in

the following species. Calyx-teeth very small or obsolete. Petals entire. Stylopodium depressed. Style short. Fruit ovate or oblong, laterally compressed. Carpels with 5 filiform ribs, the oil-tubes solitary in the intervals, 2 on the commissural side. [Greek, wheel-seed.] A few tropical or subtropical species, the following typical.

1. **Cyclospermum leptophyllum** (Pers.) Sprague, Journ. Bot. 61: 131. 1923.

Pimpinella leptophylla Pers. Syn. 1: 324. 1805.

Sison Ammi Jacq. Hort. Vind. 2: 95. 1773. Not L. 1753.

Apium Ammi Urban in Mart. Fl. Bras. 11¹: 341. 1879.

Helosciadium Ammi Britton, Fl. Bermuda 279. 1918.

Slender, glabrous, much-branched, 0.7–6 dm. high. Leaves ternately pinnatisected, the ultimate segments narrow, often incised; umbels 1–4 cm. broad, opposite the leaves, sessile, the umbellets filiform-stalked; fruit ovate, glabrous, about 2 mm. long, the ribs equal and prominent.

Roadside ditches, between Guayama and Cayey at about 750 m. elevation:—southern United States; Bermuda; Bahamas; Jamaica; Cuba; Hispaniola; Guadaloupe; Martinique; Barbados; Mexico to Paraguay. Introduced as a weed into the Old World and Australia. MARSH PARSLEY.

5. **ANETHUM** [Tourn.] L. Sp. Pl. 263. 1753.

Erect, mostly annual, glabrous herbs, with decompound leaves and small yellow flowers in many-rayed compound umbels. Involucre and involucels none, or of very few bracts. Calyx teeth obsolete. Petals suborbicular. Stylopodium small, conic. Fruit elliptic or ovate, flat, margined; carpel-ribs slender; oil-tubes solitary in the intervals. [Greek, like anise.] A few European and Asiatic species, the following typical.

1. **Anethum graveolens** L. Sp. Pl. 263. 1753.

Stem terete, simple or branched, slender, 3–9 dm. high. Leaves tripinnately dissected into nearly filiform segments, the petiole somewhat sheathing; umbel 15 cm. wide or less; involucre and involucels none; rays slender, 3–7 cm. long; umbellets several-many-flowered; petals bright yellow; fruit ovate-elliptic, 4–5.2 mm. long, distinctly margined.

Occasionally spontaneous after cultivation in Porto Rico; St. Croix; St. Thomas; Tortola:—widely grown in gardens for flavoring, in temperate and tropical regions. Native of Europe. HINOJO. DILLWEED.

Apium Petroselinum L., PARSLEY, European, cultivated in Porto Rico and the Virgin Islands, is a glabrous, biennial herb, 3–9 dm. high, with bipinnate leaves, the small segments linear to obovate, the small yellow flowers in compound umbels, the small ovate glabrous fruit prominently ribbed, with solitary oil-tubes in the intervals. [*Petroselinum sativum* Hoffm.; *Wydleria portoricensis* DC.]

Arracacia xanthorrhiza Bancroft, APIO, ARRACACHA, South American, grown in Porto Rico at middle elevations, is a tall herb with large often bipinnate leaves, the segments coarsely toothed; the tuberous roots used for food. [*A. esculenta* DC.]

Foeniculum Foeniculum (L.) Karsten, FENNEL, European, formerly grown as a drug in the Virgin Islands, is perennial, 6–12 dm. high, glabrous, the decompound leaves dissected into filiform segments; the yellow flowers are in

compound umbels without an involucre or involucels; the fruit is linear, nearly terete, ribbed, about 6 mm. long, with solitary oil-tubes between the ribs. [*Anethum Foeniculum* L.; *Foeniculum vulgare* Gaertn.]

Celeri graveolens (L.) Britton, CELERY, European, is occasionally grown as a vegetable in Porto Rico and the Virgin Islands and persistent for a time after cultivation but not naturalized. It has thick-stalked pinnate leaves with 3 or 5 thin, ovate, toothed or incised segments; its small flowers are white, in compound umbels; the oval fruit is scarcely 1 mm. long. [*Apium graveolens* L.; *Peucedanum graveolens* Benth.]

Coriandrum sativum L., CULANTRO, CORIANDER, native of the Mediterranean region, grown for flavoring in Porto Rico gardens, is an herb 2-6 dm. tall, the lower cauline and basal leaves with coarsely toothed incised or lobed segments, the upper leaves with narrowly linear segments, the rather large white flowers in compound umbels; the fruit is globose or ovoid-globose, 3-4 mm. in diameter.

Daucus Carota L., CARROT, European, occasionally grown for food in the Virgin Islands and in Porto Rico, is biennial, forming the first season a deep conic root and a tuft of decompound leaves with toothed or incised segments, subsequently sending up a stem 5-8 dm. high, bearing a few similar leaves and a compound umbel of white flowers; the fruit is about 6 mm. long, bearing barbed prickles in rows.

Cerfolium Cerefolium (L.) Britton, GARDEN CHERVIL, European, sometimes grown in Virgin Island gardens, is an annual herb, 4-6 dm. high, with ternately decompound leaves and compound umbels of small white flowers, the linear, glabrous and ribless fruit is about 6 mm. long. [*Anthriscus Cerefolium* Hoffm.]

Pimpinella Anisum L., ANISE, was recorded by Eggers as cultivated on St. Croix, but it does not appear to have become established.

Series 2. GAMOPETALAE.

Petals partly or wholly united, rarely separate or wanting.

The coherence of the petals is sometimes slight or they are quite separate, as in some Asclepiadaceae, Oleaceae and Cucurbitaceae. From this condition the coherence varies through all stages to the tubular or funnellform corallas of some Convolvulaceae, Caprifoliaceae and Carduaceae.

1. OVARY SUPERIOR.

Stamens free from the corolla or adnate merely to its base. Stamens borne on the corolla, as many as its lobes and opposite them, or twice as many, or more.

Order 1. ERICALES.

Herbs, shrubs or trees; ovary 1-celled.

Order 2. PRIMULALES.

Shrubs or trees; ovary several-celled.

Order 3. EBENALES.

Stamens borne on the corolla, as many as its lobes or fewer, and alternate with them (in *Forestiera* of the Oleaceae there is no corolla).

Corolla not scarious, nerved.

Ovaries 2, distinct (except in some Loganiaceae, and in Gentianaceae in which the ovary is compound with 2 cavities or rarely more, or with 1 cavity and 2 placentae); flowers regular; stamens mostly adnate to only the lower part of the corolla; leaves mostly opposite.

Order. 4 GENTIANALES.

Ovary 1 (compound in Boraginaceae and Lamiaceae, mostly deeply 4-lobed around the style); flowers

regular or irregular; stamens mostly adnate to the middle of the corolla-tube or beyond; leaves opposite or alternate.
Corolla scarious, nerveless.

Order 5. POLEMONIALES.
Order 6. PLANTAGINALES.

2. OVARY INFERIOR.

Anthers distinct.
Anthers united (except in Ambrosiaceae).

Order 7. RUBIALES.
Order 8. CAMPANULALES.

Order 1. ERICALES.

Undershrubs, shrubs, trees, or herbs. Leaves alternate, opposite or whorled. Flowers perfect, regular or nearly so, complete or rarely incomplete. Sepals distinct or partly united. Petals distinct or united. Stamens as many or twice as many as the petals or corolla-lobes. Ovary of several united carpels.

Ovary superior; fruit capsular.
Ovary inferior; fruit a berry.

Fam. 1. ERICACEAE.
Fam. 2. VACCINACEAE.

Family 1. ERICACEAE DC.

HEATH FAMILY.

Perennial herbs, shrubs, or trees, with simple estipulate leaves. Flowers perfect. Calyx of 4-7 nearly distinct or partly united sepals. Corolla of 4-7 distinct or partly united petals. Filaments free from the corolla, or adnate only to its base. Ovary superior, 2-7-carpellary; ovules usually numerous, anatropous. Fruit a capsule. Seeds numerous or rarely few. About 60 genera and 1100 species, of wide geographic distribution.

1. **XOLISMA** Raf. Am. Mo. Mag. 4: 193. 1819.

[*LYONIA* Nutt. Gen. 1: 266. 1818. Not Ell. 1817.]

Shrubs, or small trees, with terete twigs, alternate short-petioled leaves, and small, mostly white flowers in clusters. Calyx 4-8-lobed. Corolla globose, or urceolate, pubescent, 4-8-toothed, the teeth recurved. Stamens 8-16, included; filaments flat, incurved, pubescent; anthers attached to the filaments near their bases, truncate, the sacs opening by terminal pores. Disk 8-10-lobed. Ovary 4-8-celled; style columnar; stigma truncate; ovules numerous, pendulous. Capsule 4-8-valved, its apex intruded. Seeds elongated, the testa membranous, loose, reticulated. [Name unexplained.] About 27 species, natives of eastern North America, the West Indies and Mexico.

Leaves green above, glaucous beneath.
Leaves green on both sides.

1. *X. rubiginosa*.
2. *X. Stahlii*.

1. **Xolisma rubiginosa** (Pers.) Small, N. A. Fl. 29: 68. 1914.

Andromeda rubiginosa Pers. Syn. 1: 481. 1805.

Lyonia rubiginosa G. Don, Gen. Syst. 3: 841. 1834.

A much-branched shrub, with puberulent twigs. Leaves elliptic to oval, or obovate, 2.5-5 cm. long, 1.3-2.5 cm. broad, obtuse or rounded at the apex, often acute at the base, lustrous and reticulate above, dull, glaucous and not reticulate beneath, undulate or obscurely crenulate, short-petioled; inflorescence few-flowered; pedicels short; calyx about 4 mm. wide, the lobes 5-7, suborbicular or somewhat orbicular-reniform; corolla 6-7 mm. long, the lobes acute, much

shorter than the tube; capsule ovoid, 5 mm. long. [*Lyonia jamaicensis* of Eggers, not of D. Don; *Andromeda fasciculata* of Krebs.]

Bolongo, St. Thomas. Endemic.

2. **Xolisma Stahlia** (Urban) Small, N. A. Fl. 29: 71. 1914.

Lyonia Stahlia Urban, Symb. Ant. 5: 453. 1908.

A shrub with scurfy twigs. Leaves ovate to elliptic or obovate, 3–6 cm. long, 1.5–1.7 cm. broad, obtuse or rounded at the apex, acute at the base, bright-green, crenulate, obscurely reticulate-veined and somewhat lustrous above, dull beneath, short-petioled; inflorescence raceme-like, few-flowered; pedicels 5–11 mm. long; calyx about 3.8 mm. wide, the lobes 5, deltoid or ovate-deltoid; corolla about 5 mm. long, the lobes much shorter than the tube; capsule ovoid, 5–6 mm. long.

On Monte Helechal, near Bayamon, Porto Rico, at 500 m. elevation, collected only by Stahl. Endemic.

Family 2. **VACCINIACEAE** Lindl.

HUCKLEBERRY FAMILY.

Shrubs, or small trees, with alternate leaves, and perfect regular flowers, the pedicels commonly bracted. Calyx-tube adnate to the ovary, the limb 4–5-lobed or 4–5-cleft. Corolla 4–5-lobed, or rarely divided into separate petals, deciduous. Stamens twice as many as the corolla-lobes, epigynous, or inserted at the base of the corolla; filaments mostly short; anthers dorsally attached, 2-celled, the connective entire or 2-awned. Ovary inferior, 2–10-celled, crowned by the epigynous disk; style filiform; ovules anatropous. Fruit a fleshy berry in our genera, globose; cells 1–several-seeded. Seeds compressed; tests bony; endosperm fleshy; embryo central; radicle near the hilum. About 20 genera and 300 species, of wide distribution.

Tubular part of the anther about as long as the lower part; flowers racemose corymbose or fascicled.

Tubular part of the anther much longer than the lower part; flowers fascicled or solitary.

1. *Thibaudia*.

2. *Ceratostema*.

1. **THIBAUDIA** Pavon; H.B.K. Nov. Gen. 3: 268. 1819.

Shrubs or woody vines, with broad entire short-petioled leaves, and large flowers in terminal or axillary racemes or corymbs. Calyx urceolate or subcampanulate, terete, its short limb 5-toothed or 5-lobed. Corolla tubular, terete, with 5 short lobes. Stamens 10, all about equally long; filaments short; anthers linear, elongated, the tubular part about as long as the lower part. Ovary 5-celled; style filiform; stigma capitellate. Fruit a many-seeded berry. [Named for Thibaud de Chauvalon, a French botanist.] About 20 species, natives of tropical America, most abundant in the Andes. Type species: *Thibaudia floribunda* H.B.K.

1. **Thibaudia Krugii** Urban & Hoerold; Urban, Symb. Ant. 5: 454. 1908.

A glabrous woody vine, 3–4 m. long, or shrub-like. Leaves ovate, coriaceous, 5–11 cm. long, 7-nerved, strongly reticulate-veined beneath, the apex short-acuminate, the base rounded or obtuse, the stout petioles 4–7 mm. long; inflorescence axillary or subterminal, corymbose, several-many-flowered; pedicels

rather stout, about 10 mm. long; bracts very small, caducous; calyx-limb short, 5-toothed; berry 5–6 mm. in diameter.

Forests and summits of the eastern mountains of Porto Rico. Endemic. The corolla of this species is unknown.

2. **CERATOSTEMA** Juss.; Gmelin, Syst. 2: 676. 1791.

Shrubs or vines with coriaceous, entire or obscurely denticulate leaves, and large axillary fascicled or solitary flowers. Calyx 5-toothed. Corolla tubular, with 5 short lobes. Stamens 10; filaments short; anthers linear, elongated, the tubular part much longer than the lower part. Ovary 5-celled; style filiform; stigma capitellate. Fruit a many-seeded berry. [Greek, horned stamens.] About 25 species of tropical America, most abundant in the Andes. Type species: *Ceratostema peruvianum* Gmelin.

1. **Ceratostema portoricensis** (Urban) Hoerold, Bot. Jahrb. 42: 276. 1909.

Thibaudia portoricensis Urban, Symb. Ant. 1: 376. 1899.

A shrub, or a woody vine up to about 4 m. long, the twigs slender, short-pilose. Leaves suborbicular or ovate-orbicular, 8–20 mm. long, pale beneath, entire, rigid, brittle, the apex rounded, obtuse or acute, the base rounded, the midvein impressed above, prominent beneath, the lateral venation obsolete, the petioles 1–3 mm. long; flowers solitary in the axils on a peduncle 12 mm. long or shorter; calyx about 5 mm. long, narrowly campanulate, its limb with 5 broad teeth; corolla urceolate-cylindric, light rose-colored, about 16 mm. long, with 5 broad teeth; stamens nearly as long as the corolla, the tubular portion of the anther 2–3 times as long as the lower part; style white.

On the summits of the eastern mountains of Porto Rico. Endemic.

Order 2. PRIMULALES.

Herbs, shrubs or trees. Corolla usually present, gamopetalous. Calyx mostly free from the ovary. Stamens borne on the corolla, as many as its lobes, or twice as many, or more.

Style 1; shrubs and trees; fruit drupaceous or baccate.

Staminodes none; fruit 1-seeded.

Corolla bearing staminodes at the sinuses; fruit several-many-seeded.

Styles 5; herbs; fruit an achene or utricle.

Fam. 1. MYRSINACEAE.

Fam. 2. THEOPHRASTACEAE.

Fam. 3. PLUMBAGINACEAE.

Family 1. MYRSINACEAE Lindl.

MYRSINE FAMILY.

Trees or shrubs, usually glabrous, the leaves mostly alternate, punctate or lineolate, estipulate, the small regular flowers variously clustered. Calyx inferior, persistent, 4–6-parted. Corolla mostly rotate or salverform, rarely tubular or of separate petals. Stamens as many as the corolla-segments and opposite them; filaments usually short, distinct or sometimes united; anthers longitudinally dehiscent; staminodes none. Ovary superior, 1-celled; style short or long; stigma various; ovules few, usually immersed in the central placenta. Fruit small, baccate, 1-seeded, sometimes nearly dry. Seed subglobose, the testa thin, the endosperm fleshy or horny. About 20 genera and over 450 species, mostly tropical in distribution.

1. Flowers paniculate or racemose.
 Ovules several or many; corolla contorted; style elongated.
 Ovules few; style short or none or rarely elongated.
 Style elongated; corolla-lobes valvate.
 Style short or wanting.
 Anthers dorsifixed.
 Flowers dioecious; filaments slender; corolla-lobes imbricated.
 Flowers perfect; filaments short; anthers long; corolla-lobes contorted.
 Anthers basifixed; filaments very short.
 2. Flowers in small lateral fascicles, subumbellate.
1. *Icacorea*.
 2. *Parathesis*.
 3. *Petesioides*.
 4. *Stylogyne*.
 5. *Grammadenia*.
 6. *Rapanea*.

1. **ICACOREA** Aubl. Pl. Guian. 2: Suppl. 1. 1775.

Shrubs or trees, with alternate, mostly entire leaves and perfect or polygamodioecious white or pink flowers in cymes or panicles. Calyx campanulate, 4-5-parted. Corolla nearly rotate, usually 5-parted, the segments spreading or reflexed, contorted. Stamens usually 5; filaments short or slender, borne at the top of the short corolla-tube; anthers acute or acuminate. Ovary globose; stigma discoid or truncate; ovules several. Berry little fleshy. [Guiana name.] Over 200 species, of tropical and subtropical regions, the Porto Rico ones called MAMEYUELO. Type species: *Icacorea guianensis* Aubl.

Leaves up to 22 cm. long, strongly reticulate-veined; sepals ciliate.
 Leaves 5-11 cm. long, delicately veined; sepals scarcely ciliate.
 Species incompletely known.

1. *I. glauciflora*.
2. *I. guadalupensis*.
3. *I. (?) luquillensis*.

1. ***Icacorea glauciflora*** (Urban) Britton.

Ardisia glauciflora Urban, Symb. Ant. 1: 382. 1899.

A tree, 4-8 m. high, the stout twigs tomentulose. Leaves elliptic to oblong-obovate, thick-coriaceous, 10-22 cm. long, glabrous, prominently reticulate-veined above, the apex obtuse, the base obtuse or narrowed, the stout petioles 1 cm. long or less; panicles terminal, densely many-flowered, tomentulose, shorter than the leaves; pedicels stout, 8-14 mm. long; sepals ovate, rounded, ciliate; corolla deeply 5-lobed, glaucescent, glabrous, about 12 mm. broad; young fruit subglobose; style slender.

Forests of the higher Porto Rico mountains. Endemic. The nearly white, hard and heavy wood is prized for furniture. A small tree of the forest on Mt. Alegrillo, with narrowly obovate leaves, may represent another species.

2. ***Icacorea guadalupensis*** (Duch.) Britton; P. Wilson, Bull. N. Y. Bot. Gard. 8: 401. 1917.

? *Ardisia obovata* Hamilt. Prodr. 26. 1825.

Ardisia coriacea A. DC. Prodr. 8: 122. 1844. Not Sw. 1788.

Ardisia guadalupensis Duch.; Griseb. Goett. Abh. 7: 237. 1857.

A glabrous shrub 1-3 m. high, or a tree up to 15 m. high, the stout twigs light gray. Leaves elliptic to elliptic-obovate, coriaceous, 10-15 cm. long, obtuse or acutish at the apex, narrowed or cuneate at the base, paler green beneath than above, delicately veined, the stout petioles 7-12 mm. long; panicles terminal, densely many-flowered, 10-15 cm. long; pedicels 2-4 mm. long, rather stout; calyx about 2 mm. long, its 5 segments oblong, obtuse, punctate; corolla white, rotate, its 5 segments ovate or ovate-elliptic, obtuse, symmetrical, more or less punctate or lineolate; fruit subglobose or depressed-globose, black when mature, 6-8 mm. in diameter, tipped by the short style.

Woodlands, forests, thickets and river banks, Porto Rico, at lower and middle elevations; doubtfully recorded from the summit of Monte Yunque; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Bahamas; Saba to St. Lucia. Its wood is light reddish brown, hard and heavy. BADULA.

3. *Icacorea* (?) *luquillensis* Britton, sp. nov.

A shrub, about 2.5 m. high, glabrous or very nearly so throughout, the twigs rather stout. Leaves obovato, coriaceous, entire, rather obscurely reticulate-veined with the midvein prominent on both sides, 5–9 cm. long, the apex rounded, the base narrowed, the petioles 6–12 mm. long; panicle many-flowered, somewhat shorter than the leaves; fruiting pedicels 4–7 mm. long; sepals ovate, rounded, ciliolate, 1.5 mm. long; fruit globose, about 4 mm. in diameter; style somewhat shorter than the fruit; corolla unknown.

Forest, Catalina-Yunque Trall, Sierra de Luquillo at 1000 m. altitude (*Britton and Bruner* 7624, Feb. 23–26, 1923).

Ardisia maculata of Bello, not of Poitier, has not been identified by subsequent botanists; no description of it was published.

2. **PARATHESIS** [A. DC.] Hook. f. in Benth. & Hook. Gen. Pl. 2: 645. 1876.

Trees or shrubs, with puberulent or tomentulose twigs and small perfect, 5-parted flowers in terminal or axillary panicles. Calyx very small, the sepals connate at the base. Corolla rotate, pubescent, its lobes valvate. Stamens borne at the throat of the corolla; filaments filiform; anthers sagittate-lanceolate, dorsifixed. Ovary globose; ovules few; style filiform; stigma very small. Fruit 1-seeded, globose. [Greek, referring to the valvate corolla-lobes.] A few species, natives of western tropical continental America and the West Indies, the following typical.

1. *Parathesis serrulata* (Sw.) Mez in Urban, Symb. Ant. 2: 403. 1901.

Ardisia serrulata Sw. Prodr. 48. 1788.

Ardisia crenulata Vent. Choix des Plantes 5. 1803.

A shrub, 2–3 m. high, rarely a small tree, the young twigs and inflorescence densely lepidote-tomentulose. Leaves oblong or oblong-oblancoate, membranous, crenulate or entire, 7–16 cm. long, tomentulose, the base cuneate, the petioles 1–3 cm. long; panicles terminal, many-flowered; pedicels 1–4 mm. long; flowers pink, 6–8 mm. broad; corolla deeply cleft, tomentulose; filaments glabrous; style pilose above; fruit black, fleshy, subglobose, 6–8 mm. in diameter.

Wooded hills and forests, Porto Rico, in wet or moist districts, mostly at middle or higher elevations:—Hispaniola; Mexico to Venezuela. RASCA-GARGANTA. SECA-GARGANTA.

3. **PETESIOIDES** Jacq. Sel. Am. 17. 1763.

Glabrous trees or shrubs, with entire or sometimes serrate leaves, and small dioecious 4- or 5-parted flowers in terminal or axillary racemes or panicles. Sepals distinct, or partly connate in the pistillate flowers. Corolla of the staminate flower tubular, its lobes mostly short, imbricated; corolla of the pistillate flowers tubular or short, irregularly cleft. Stamens of the staminate flowers with slender filaments, the anthers dorsally attached, recurved; pistillate flowers with reduced staminodia. Ovary subglobose; style short or slender; ovules few; fruit globose or subglobose, 1-seeded. [Greek, resembling *Petesia*.] About 20 species, of the West Indies. Type species: *Petesioides laurifolium* Jacq.

Leaves serrate; inflorescence erect.

Leaves entire or indistinctly crenulate near the apex; inflorescence pendulous.

1. *P. yunqueense*.

2. *P. pendulum*.

1. *Petsioides yunquense* (Urban) Britton.*Ardisia yunquensis* Urban, Symb. Ant. 1: 383. 1899.*Wallenia yunquensis* Mez in Urban, Symb. Ant. 2: 413. 1901.

A shrub, about 3 m. high. Leaves clustered at the ends of twigs or some of them scattered, subcoriaceous, oblong to oblong-obovate, reticulate-veined, 7–15 cm. long, serrate above the middle, the apex acute, the base narrowed, the petioles 5–8 mm. long; racemes appearing terminal, erect, few-several-flowered, 7 cm. long or less; pedicels filiform, 5–9 mm. long; sepals about 2 mm. long; corolla pale violet, cylindric, 5–7 mm. long; filaments very short.

Summit of Monte Yunque. Endemic.

2. *Petsioides pendulum* (Urban) Britton.*Ardisia pendula* Urban, Symb. Ant. 1: 383. 1899.*Ardisia purpurascens* Urban, Symb. Ant. 1: 384. 1899.*Ardisia purpurascens corymbifera* Urban, Symb. Ant. 1: 384. 1899.*Wallenia pendula* Mez in Urban, Symb. Ant. 2: 413. 1901.*Wallenia purpurascens* Mez in Urban, Symb. Ant. 2: 412. 1901.*Wallenia purpurascens corymbifera* Mez in Urban, Symb. Ant. 2: 413. 1901.

A shrub, 2–3 m. high, or sometimes forming a tree up to 10 m. high, the leaves mostly clustered at the ends of the stout twigs. Leaves obovate to oblong-obovate, subcoriaceous, reticulate-veined, 7–25 cm. long, entire, or obscurely crenulate toward the acute or obtuse apex, the base narrowed or subcuneate, the petioles 1–2.5 cm. long; racemes pendulous, slender, many-flowered, 2 dm. long or less; pedicels 1–2.5 mm. long; sepals obtuse or acutish, about 2 mm. long; corolla greenish-white, 3–4 mm. long; fruit globose or depressed-globose, about 5 mm. in diameter.

Forests and wooded hills in wet or moist districts of Porto Rico. Endemic. JACANILLO.

4. **STYLOGYNE** A. DC. Ann. Sci. Nat. II. 16: 91. 1841.

Trees or shrubs, mostly glabrous, with broad alternate petioled leaves and small, 5-parted, perfect or rarely dioecious flowers in lateral, axillary or terminal panicles or compound corymbs. Sepals distinct, or nearly so. Corolla deeply parted, its lobes dextrorsely contorted. Filaments short; anthers elongated, dorsally inserted. Ovary globose or ovoid; style short or slender; ovules few. Fruit subglobose, 1-seeded, crustaceous. [Greek, referring to the style.] A few species, natives of tropical America. Type species: *Stylogyne Martiana* A. DC.

1. *Stylogyne lateriflora* (Sw.) Mez in Urban, Symb. Ant. 2: 418. 1901.*Ardisia lateriflora* Sw. Prodr. 48. 1788.*Ardisia caribaea* Miquel, in Mart. Fl. Bras. 10: 289. 1856.

A shrub, 1–2 m. high, glabrous throughout. Leaves elliptic or elliptic-obovate, subcoriaceous, 7–15 cm. long, entire, pinnately veined, the apex obtuse or acute, the base obtuse or narrowed, the petioles 4–9 mm. long; panicles axillary or lateral, many-flowered, shorter than the leaves; pedicels slender, 4–8 mm. long; flowers white, about 8 mm. broad; sepals about 2 mm. long; anthers nearly as long as the petals; style slender; fruit globose, 4–5 mm. in diameter.

Sierra de Luquillo, in forest near Banadero, at 600 m. altitude, collected only by Eggers (according to Mez); St. Thomas (according to Eggers):—Guadeloupe to Trinidad. Not seen by us from within the limits of this flora; perhaps erroneously recorded.

5. **GRAMMADENIA** Benth. Pl. Hartw. 218. 1839.

Glabrous shrubs or small trees, with small entire, sometimes glandular-lineate leaves, the perfect or rarely dioecious, small 5-parted flowers subumbellate, corymbose or racemose. Sepals connate at the base. Corolla-lobes imbricated, spreading, the stamens borne at their bases. Filaments very short or none; anthers short, rounded or emarginate. Ovary globose; style short; stigma truncate; ovules 2-4. Fruit globose or ellipsoid, crustaceous, 1-seeded. [Greek, linear glands.] About 10 species, natives of West Indian and South American mountain regions. Type species. *Grammadenia marginata* Benth.

1. **Grammadenia Sintenisii** (Urban) Mez In Urban, Symb. Ant. 2: 425. 1901.

Ardisia Sintenisii Urban, Symb. Ant. 1: 381. 1899.

A shrub, or a small tree 4-5 m. high, with slender but rather stiff branches. Leaves oblong-obovate to oblanceolate, rather thin, 4-8 cm. long, faintly pinnately veined, the apex bluntly short-acuminate or obtuse, the base subcuneate, the petioles 4-6 mm. long; inflorescence terminal, slender-peduncled, subumbellate, few-flowered, shorter than the leaves; pedicels filiform, 5-15 mm. long; flowers greenish-white, 5-7 mm. broad; sepals narrowly elliptic, obtuse; corolla-lobes rounded; fruit ellipsoid, apiculate, about 8 mm. long.

Forests and summits of the eastern mountains of Porto Rico. Endemic.

6. **RAPANEA** Aubl. Pl. Guian. 1: 121. 1775.

Shrubs or small trees, with alternate coriaceous or subcoriaceous leaves, and small bracted polygamo-dioecious flowers, in lateral or axillary fascicles. Calyx mostly 4-5-cleft, persistent. Corolla 4-5-parted, or rarely of 4 or 5 petals, the segments spreading or recurved. Stamens borne on the bases of the corolla-segments; filaments short; anthers obtuse. Ovary globose or ovoid; style short or slender; stigma various; ovules few or many. Fruit a globose, nearly dry small 1-seeded berry. [Guiana name.] Over 80 species, mostly of tropical regions. Type species: *Rapanea guianensis* Aubl.

Twigs glabrous; leaves elliptic to obovate, the apex rounded.

Twigs tomentulose; leaves lanceolate or oblong-lanceolate, acute or acuminate.

1. *R. guianensis*.

2. *R. ferruginea*.

1. **Rapanea guianensis** Aubl. Pl. Guian. 1: 121. 1775.

Myrsine floribunda R. Br. Prodr. 533. 1810.

Myrsine baccata A. DC. Ann. Sci. Nat. II. 16: 86. 1841.

Myrsine guianensis Kuntze, Rev. Gen. Pl. 402. 1891.

A shrub, or small tree up to 6 m. high, the trunk sometimes 1.5 dm. in diameter, the foliage glabrous, the bark smooth and gray. Leaves mostly clustered near the ends of the rather slender twigs, short-petioled, obovate or oblong, 4-10 cm. long, obtuse at the apex, narrowed at the base, bright green and somewhat shining above, dull green beneath, the midvein prominent, the lateral veins faint; flowers green, about 4 mm. broad, nearly sessile on the twigs below the leaves; sepals ovate, about 1.5 mm. long; corolla-lobes oblong, glandular-ciliate, 2-3 times as long as the sepals, somewhat unequal; fruit globose, black when mature, about 5 mm. in diameter. [*Myrsine coriacea* of Bello, not of R. Brown.]

Thickets and woodlands at lower elevations, northern and western districts of Porto Rico; Tortola:—Florida; Bahamas; Jamaica; Cuba; Hispaniola; Martinique; St. Vincent; Grenada; Trinidad; continental tropical America. BADULA.

2. *Rapanea ferruginea* (R. & P.) Mez in Urban, Symb. Ant. 2: 429. 1901.*Caballeria ferruginea* R. & P. Syst. 250. 1788.*Myrsine floribunda* R. Br. Prodr. 533. 1810.*Myrsine ferruginea* Spreng. Syst. 1: 664. 1825.*Myrsine Berterii* A. DC. Trans. Linn. Soc. 17: 109. 1834.

A tree, 5–10 m. high, the twigs rather densely tomentulose. Leaves alternate, lanceolate or oblong-lanceolate, 5–8 cm. long, the apex acute or acuminate, the base narrowed, the upper surface bright green, nearly or quite glabrous and minutely tuberculate, the under side tomentulose, at least on the prominent midrib, the lateral venation obsolete; petioles slender, tomentulose, 8–15 mm. long; flowers green, nearly sessile, 2–3 mm. broad, in small axillary or lateral clusters; sepals ovate, united to about the middle; corolla-lobes acutish; fruit globose, black or bluish, about 4 mm. in diameter. [*Myrsine laeta* of Grisebach, not of A. de Candolle; *Myrsine coriacea* of Stahl, not of R. Brown.]

Wooded hills, thickets, forests and forest borders, Porto Rico, in wet or moist districts, ascending to the higher elevations;—Jamaica; Cuba; Hispaniola; Saba to Grenada; continental tropical America. ARRAYAN.

Family 2. **THEOPHRASTACEAE** D. Don.

THEOPHRASTA FAMILY.

Trees or shrubs, with evergreen coriaceous estipulate leaves, and regular, perfect or polygamo-dioecious flowers in axillary or terminal clusters, or solitary. Calyx inferior, mostly 5-parted, the segments obtuse, imbricated. Corolla gamopetalous, rotate-campanulate or cylindric-campanulate, mostly 5-lobed, the lobes imbricated. Stamens 5, rarely 4, borne near the base of the corolla-tube; filaments subulate or flattened; anthers mostly extrorse. Staminodia 5. Ovary superior, 1-celled; style short or slender; stigma capitate or discoid; ovules numerous. Fruit coriaceous or fleshy, indehiscent, few-several-seeded. Five genera and about 50 species, of tropical distribution.

1. **JACQUINIA** L.; Jacq. Enum. 2, 15. 1760.

Evergreen shrubs or small trees, with opposite or verticillate coriaceous leaves, and small perfect white or yellow, racemed, corymbed or paniced flowers. Sepals 5, imbricated. Corolla salverform or short-campanulate, 5-lobed, the lobes imbricated in the bud, spreading at anthesis. Staminodia 5, borne on the corolla-tube. Stamens 5, borne on the base of the corolla-tube. Ovary 5-carpellary; style short; ovules usually many. Fruit ovoid or globose, coriaceous. Seeds compressed, with cartilaginous endosperm. [Commemorates Nicholas Joseph von Jacquin, 1727–1817, distinguished Austrian botanist.] About 25 species, of tropical America. Type species: *Jacquinia ruscifolia* Jacq.

Leaves spinulose-tipped.

1. *J. umbellata*.

Leaves not spinulose-tipped.

2. *J. revoluta*.

Sepals ciliolate.

3. *J. Berterii*.

Sepals eciliate.

Inflorescence few-flowered; pedicels reflexed; leaves 2–4 cm. long.

4. *J. Barbasco*.

Inflorescence racemose, several-many-flowered; pedicels not reflexed; leaves 4–10 cm. long.

1. *Jacquinia umbellata* DC. Prodr. 8: 150. 1844.

A shrub, 3 m. high or less, the numerous, slender but stiff twigs puberulent. Leaves rigid, glabrous, elliptic to oblong, 2–4 cm. long, faintly 3-nerved and pinnately veined, the apex acute and spinulose-tipped, the base narrowed or

cuneate, the petioles 1–3 mm. long; inflorescence terminal, subumbellate, 2–5-flowered; pedicels 3–8 mm. long; sepals nearly orbicular, entire, about 2.5 mm. long; corolla orange or orange-purple, about 5 mm. long, its lobes rounded; fruit ellipsoid or obovoid, 8–12 mm. long, orange. [*J. macrocarpa* of Sprengel, not of Cavanilles; *J. aristata* of Grisebach, not of Jacquin; *J. aurantiana* of Bertero, not of Aiton.]

Hillsides and thickets, southern and western districts of Porto Rico at lower and middle elevations. Races differ in the size and width of leaves. Endemic. CHIRRIADOR.

2. *Jacquinia revoluta* Jacq. Fragm. 64. 1809.

A small tree, about 7 m. high or less, or shrubby, the slender twigs finely lepidote. Leaves obovate, coriaceous, faintly veined, punctate-lepidote, 3–6 cm. long, the apex rounded, emarginate or mucronulate, the base narrowed, the petioles 1–2 mm. long; inflorescence terminal, racemose, few-several-flowered; pedicels 8–10 mm. long; flowers fragrant; sepals ciliolate or nearly naked, rounded, about 2 mm. long; corolla white, about 6 mm. long; fruit orange, globose, about 6 mm. in diameter.

Upper slopes of Sage Mountain, Tortola (*Fishlock 75*):—St. Martin; Antigua; Guadeloupe; Martinique; Trinidad; Venezuela. A barren specimen, collected at Guayanilla, Porto Rico (*Stevens 9072*), may be referable to this species.

3. *Jacquinia Berterii* Spreng. Syst. 1: 668. 1825.

Jacquinia Berterii portoricensis Urban, Symb. Ant. 1: 377. 1899.

Jacquinia Berterii retusa Urban, Symb. Ant. 1: 378. 1899.

A much-branched shrub, 1–3 m. high, or tree up to about 7 m. high, the bark whitish, the young twigs scurfy-lepidote. Leaves various in form, oblong to obovate or oblong-lanceolate, coriaceous, 2–4 cm. long, rounded, retuse or acute at the apex, cuneate at the base, usually inconspicuously veined, the petioles 1–2 mm. long; inflorescence terminal or in the uppermost axils, 1–6-flowered, much shorter than the leaves; pedicels 5–8 mm. long, thickened upwardly, reflexed; sepals nearly orbicular, 1.5–2 mm. long, glabrous; corolla about 3 mm. long, its lobes reflexed; fruit ovoid to subglobose, orange or yellow, 6–8 mm. in diameter.

Rocky hillsides and thickets, Porto Rico, in the dry southwestern districts near the coast; Vieques; St. Croix; St. Thomas; St. Jan; Anegada:—Bahamas; Cuba; Hispaniola; Anguilla; St. Martin; Guadeloupe.

4. *Jacquinia Barbasco* (Loefl.) Mez, Pflanzr. 15: 32. 1903.

Chrysophyllum Barbasco Loefl. Iter. 204, 277. 1758.

Jacquinia armillaris Jacq. Enum. 15. 1760.

Jacquinia arborea Vahl, Eclog. 1: 26. 1796.

Jacquinia armillaris arborea Griseb. Fl. Br. W. I. 397. 1861.

A shrub 1–3 m. high, or a small tree up to about 5 m. high, the rather stout twigs finely lepidote. Leaves obovate or oblong-obovate, coriaceous and somewhat fleshy, light green, mostly clustered, 4–10 cm. long, the midvein rather prominent beneath, the lateral venation obscure, both surfaces lepidote-punctulate, the apex rounded or emarginate, the base narrowed or subcuneate, the petioles 3–6 mm. long; racemes terminal, several-many-flowered, 4–12 cm. long; flowers fragrant; pedicels 8–18 mm. long, ascending, rather stout; sepals nearly orbicular, glabrous, 2–3 mm. long; corolla white, about 6 mm. long, its lobes rounded; fruit globose, 8–12 mm. in diameter.

Coastal woodlands and thickets, Porto Rico; Mona; Icacos; Vieques; Culebra; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda; Anegada:—Jamaica; Cuba; Hispaniola; St. Martin to Tobago; Curaçao; Bonaire. AZUCARES. BARBASCO.

Family 3. **PLUMBAGINACEAE** Lindl.**PLUMBAGO** FAMILY.

Perennial herbs or shrubs, with basal or alternate leaves, and perfect and regular clustered flowers. Calyx inferior, 4-5-toothed, sometimes plaited at the sinuses, the tube 5-15-ribbed. Corolla of 4 or 5 hypogynous clawed segments connate at the base, or united into a tube. Stamens 4 or 5, opposite the corolla-segments, hypogynous; anthers 2-celled, attached by their backs to the filaments, the sacs longitudinally dehiscent. Disk none. Ovary superior, 1-celled; ovule solitary, anatropous, pendulous; styles 5. Fruit a utricle or achene, enclosed by the calyx, rarely a dehiscent capsule. Seed solitary; testa membranous; endosperm mealy, or none; embryo straight; cotyledons entire. About 10 genera and 350 species, of wide distribution, many in saline situations.

1. **PLUMBAGO** L. Sp. Pl. 151. 1753.

Perennial herbs, shrubs or vines, with alternate, often clasping leaves, the purple blue red or white flowers in bracted spikes. Calyx tubular, 5-ribbed, glandular, with 4 or 5 erect lobes. Petals 4 or 5, their claws united into a tube, their blades entire, spreading, the corolla thin, salverform. Stamens 5, distinct, the filaments dilated at the base, the anthers linear. Styles filiform, stigmatic on the inner side, partly united. Fruit capsular. [Latin, leadwort.] About a dozen species, natives of southern Europe and west central Asia and tropical America. Type species: *Plumbago europaea* L.

1. **Plumbago scandens** L. Sp. Pl. ed. 2, 215. 1762.

A perennial woody herb, the branches often elongated and vine-like, glabrous, sometimes 1 m. long. Leaves ovate to oblong-lanceolate, membranous, glabrous, 3-10 cm. long, acute or acuminate at the apex, narrowed at the base, the petioles 1 cm. long or less; spikes slender, peduncled, several-many-flowered, 5-12 cm. long; bracts lanceolate, acuminate, persistent, about 5 mm. long; calyx about 1 cm. long, beset with long-stalked glands; corolla white, its filiform tube about 2 cm. long, its obovate mucronate spreading lobes 5-7 mm. long.

Banks, woods, thickets and waste grounds, Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Florida; West Indies; continental tropical America. HIGUILLO. MELADILLO. WHITE PLUMBAGO.

Plumbago capensis Thunb., ISABEL SEGUNDA, BLISTER-LEAF, BLUE PLUMBAGO, South African, grown for ornament in Porto Rico and Virgin Island gardens, is a slender leafy half-climbing shrub 1-2 m. long, with oblong to spatulate leaves 2.5-7.5 cm. long, and large blue flowers in terminal puberulent spikes, the narrowly cylindric, glandular calyx-tube is about 12 mm. long, the slender glabrous corolla-tube about 4 cm. long; the corolla limb about 2.5 cm. broad.

Plumbago rosea L., RED PLUMBAGO, Asiatic, grown for ornament in Porto Rico and Virgin Island gardens, resembles *P. capensis*, but is glabrous, its leaves ovate-lanceolate or elliptic, the scarlet flowers in elongated spikes, the corolla-tube about 2 cm. long.

Plumbago zeylanica L. was formerly grown on St. Croix, according to West.

Dodecatheon Meadia L., SHOOTING STAR, North American, of the Family **Primulaceae**, listed by Krebs as found in St. Thomas, may have been grown there from seed.

Order 3. EBENALES.

Shrubs or trees, with alternate simple leaves, the flowers mostly regular. Calyx free from the ovary (inferior) or more or less adnate to it. Corolla gamopetalous or sometimes polypetalous. Stamens borne on the tube or base of the corolla, as many as its lobes, and opposite them, or more numerous.

Stamens as many as the corolla-lobes.

Fam. 1. SAPOTACEAE.

Stamens twice as many as the corolla-lobes, or more.

Fam. 2. EBENACEAE.

Styles 2-8, flowers mostly monoecious or dioecious.

Style 1, simple or lobed; flowers mostly perfect.

Stamens in several series.

Fam. 3. SYMPLOCACEAE.

Stamens in but 1 series.

Fam. 4. STYRACACEAE.

Family 1. SAPOTACEAE Reichenb.

SAPODILLA FAMILY.

Shrubs or trees, the sap often milky, the leaves mostly alternate, entire, estipulate, often finely veined, the perfect or rarely polygamous flowers clustered. Sepals 4-12, imbricated. Corolla lobed, often appendaged between the lobes. Stamens as many as the corolla-lobes, often alternating with staminodia; filaments distinct. Ovary sessile, 4-12-celled; styles united; ovules solitary in each cavity, anatropous. Fruit a berry, often large. Seeds shining, smooth; embryo straight. About 35 genera, comprising over 400 species, mostly of tropical distribution.

A. Corolla-lobes unappendaged.

a. Flowers with both fertile stamens and staminodia.

Staminodia petal-like, broad.

Sepals 6; hilum shorter than the seed.

Sepals 5; hilum as long as the seed.

Staminodia filament-like or scale-like.

Staminodia scale-like.

Staminodia filament-like.

Sepals 4 or 5 in 1 series or 2.

Sepals about 10, imbricated in several series.

b. Stamens all fertile; staminodia none.

B. Corolla-lobes with an appendage on both sides at base.

Sepals 5.

Seeds with copious endosperm.

Seeds without endosperm.

Sepals 6 or 8.

1. *Sapota*.

2. *Micropholis*.

3. *Sideroxylon*.

4. *Lucuma*.

5. *Achras*.

6. *Chrysophyllum*.

7. *Dipholis*.

8. *Bumelia*.

9. *Manilkara*.

1. SAPOTA [Plum.] Mill. Gard. Dict. ed. 7. 1759.

A spreading evergreen tree, with alternate coriaceous, oblong to elliptic leaves, and rather large, peduncled, mostly 6-parted; whitish flowers solitary in the axils, the sap milky. Sepals in 2 series. Corolla nearly urceolate, scarcely longer than the calyx; anthers sagittate; staminodia little shorter than the corolla-lobes. Ovary 10-12-celled; ovules ascending; style slender, exserted; stigma small. Fruit a large, rough-skinned berry. Seeds black, shining, the endosperm fleshy. [Aboriginal West Indian name.] A monotypic genus.

1. *Sapota Achras* Mill. Gard. Dict. ed. 8, no. 1. 1768.

Achras Zapota L. Syst. ed. 10, 988. 1759. Not *A. Zapota* L. Sp. Pl. 1190. 1753

A tree, up to about 15 m. high, the bark dark brown, the twigs rather stout, the petioles, peduncles and calyx brownish pubescent. Leaves mainly clustered at the ends of the twigs, 5–12 cm. long, the lateral veins nearly transverse, delicate, close together, the apex obtuse, the base mostly narrowed, the slender petioles 5–20 mm. long; peduncles about as long as the petioles; sepals 8–10 mm. long; corolla-lobes about half as long as the tube; staminodia longer than the stamens; fruit globose or ovoid, 3–8 cm. in diameter, rough, brown, the flesh sweet, brownish, milky; seeds usually several, flattened, about 2 cm. long, with a white scar on the inner edge.

Hillsides and woodlands at lower elevations, Porto Rico, perhaps not indigenous, much planted for its fruit and for shade; St. Croix; St. Thomas; St. Jan:—West Indies; continental tropical America. The very heavy light red wood is hard and durable, used for furniture and in cabinet work. The fruit is one of the most important of tropical regions. NISPERO. SAPODILLA. MESPLE. NASEBERRY.

2. *MICROPHOLIS* [Griseb.] Pierre, Sapot. 37. 1891.

Evergreen trees, with hard and heavy wood, coriaceous leaves and small axillary or lateral flowers. Sepals usually 5, imbricated. Corolla mostly 5-lobed. Staminodia mostly small, broad, rarely narrow. Stamens borne on the throat of the corolla. Disk hispid or villous. Ovary mostly 5-celled; style short; ovules anatropous. Fruit a 1-seeded berry. Seed oblong, narrowed at both ends, shining, the hilum long, the cotyledons striate, the endosperm thick. [Greek, referring to the small staminodia.] About 40 species, natives of tropical America, those of Porto Rico known as CAIMITILLO. Type species: *Chrysophyllum rugosum* Griseb.

Leaves glabrous and shining on both sides, at least when old.

Leaves tomentulose beneath, glabrous above.

Fruit about 2 cm. long; seed curved.

Fruit 3–5 cm. long; seed straight.

1. *M. garcinifolia*.

2. *M. curvata*.

3. *M. chrysophylloides*.

1. *Micropholis garcinifolia* Pierre, Sapot. 38. 1891.

Micropholis Urbani Pierre, Sapot. 38. 1891.

A tree, up to about 20 m. in height, the twigs glabrous, striate. Leaves elliptic or oblong-elliptic, 4–8 cm. long, or those of shoots larger, glabrous when mature, silky beneath when young, the apex obtuse, emarginate or acute, the base obtuse or narrowed, the stout petioles 3–8 mm. long, the numerous nearly straight veins rather prominent on both sides; flowers 1–3 in the axils; pedicels 2–8 mm. long; sepals 3–4.5 mm. long, tomentose; corolla about 3 mm. long; fruit 2.5–4 cm. long, seed about 1.6 cm. long.

Forests at high elevations in the eastern mountains of Porto Rico. Endemic.

2. *Micropholis curvata* (Pierre) Urban, Symb. Ant. 5: 124. 1904.

Micropholis curvata Pierre, Sapot. 39. 1891.

A tree, 10–20 m. high, the young twigs puberulent. Leaves elliptic to elliptic-obovate, 2–7 cm. long, the apex rounded, acute or short-acuminate, the base narrowed or obtuse, glabrous and shining above, densely puberulent beneath, the lateral venation not prominent, the petioles 7 mm. long or less; pedicels 1–5, about as long as the petioles; sepals about 3 mm. long; fruit ellipsoid, tomentulose, 2–3 cm. long; seed curved.

Forests of the western mountains of Porto Rico. Endemic.

3. *Micropholis chrysophylloides* Pierre, Sapot. 38. 1891.

Micropholis portoricensis Pierre, Sapot. 38. 1891.

Micropholis Balata Pierre in Urban, Symb. Ant. 5: 120. 1904.

Micropholis portoricensis mesuifolia Pierre; Urban, Symb. Ant. 5: 124. 1904.

A tree, recorded as attaining a maximum height of about 25 m., the twigs golden-tomentose. Leaves elliptic to obovate, 4–8 cm. long, glabrous above, tomentulose beneath, the apex obtuse, acute, short-acuminate or sometimes emarginate, the base narrowed or cuneate, the petioles 5–9 mm. long; pedicels 3–8, about as long as the petioles or shorter; sepals about 3 mm. long; corolla about as long as the sepals, its lobes shorter than the tube; fruit oblong, 3–5 cm. long; seed straight.

Forests of the central and western mountains of Porto Rico:—Montserrat; Guadeloupe; Antigua; Dominica; St. Lucia; St. Vincent.

3. *SIDEROXYLON* L. Sp. Pl. 192. 1753.

Unarmed, hard-wooded, evergreen trees or shrubs, with alternate coriaceous, slender-petioled leaves, and small, 5-parted, greenish-yellow or white flowers in dense axillary or lateral fascicles. Sepals mostly obtuse, imbricated. Corolla nearly rotate, its lobes obtuse, not appendaged. Stamens borne near the middle or top of the corolla-tube, included, opposite the lobes; filaments slender; anthers extrorse; staminodia entire or toothed, alternating with the filaments. Ovary 5-celled or sometimes 2–3-celled; ovules ascending; style short or slender. Berry ovoid or subglobose, usually 1-seeded. Seed with a crustaceous testa and cartilaginous endosperm. [Greek, referring to the hard wood.] About 75 species, natives of warm and tropical regions. Type species: *Sideroxylon inerme* L.

Leaves mostly obtuse or rounded; fruit yellow.

Leaves acute or acuminate; fruit red or brown.

1. *S. foetidissimum*.

2. *S. portoricense*.

1. *Sideroxylon foetidissimum* Jacq. Enum. 15. 1760.

Sideroxylon mastichodendron Jacq. Coll. 2: 253. 1788.

Sideroxylon pellidum Spreng. Syst. 1: 666. 1825.

A tree, attaining a maximum height of about 25 m., with a trunk up to 1.5 m. in diameter, the bark splitting into scale-like plates, the twigs rather slender, glabrous. Leaves oblong to oblong-ovate or oval, 5–15 cm. long, sparingly pubescent when young, becoming glabrous, mostly rounded at the apex, or those of shoots acute or acuminate, rounded or narrowed at the base, lustrous, the slender petioles 2–7 cm. long; fascicles several-many-flowered, shorter than the petioles; pedicels 4–10 mm. long; sepals nearly orbicular, obtuse, glabrous, about 2 mm. long; corolla greenish-yellow, about 7 mm. broad, its lobes oblong; obtuse; staminodia lanceolate, acuminate, 1 mm. long; berry drupe-like, yellow, oval, 2–2.5 cm. long, glabrous, acid.

Woodlands, hillsides and river-valleys, Porto Rico, at lower elevations in dry and moist districts; St. Croix; St. Thomas; St. Jan:—Florida; Bahamas; Jamaica; Cuba; Hispaniola; Saba to Barbados; recorded from Bonaire. Its reddish or yellowish wood is hard, very strong and durable, with a specific gravity a little over 1.00. TORTUGO AMARILLO. MASTIC-BULLY. Erroneously called Ausubo.

2. *Sideroxylon portoricense* Urban, Symb. Ant. 5: 134. 1904.

A large tree, sometimes 30 m. high, the young twigs brown-pilose, soon glabrous. Leaves oblong-elliptic, 7–20 cm. long, narrowed at both ends, finely reticulate-veined, the base subcuneate, the petioles 2–3 cm. long; fruiting pedicels

7–8 mm. long; sepals suborbicular, about 2.5 mm. broad; berry ovoid, about 2 cm. long, narrowed and truncate above, brown or red; seeds ovate, brown.

Mountain forests, western and central districts of Porto Rico; Hispaniola. TAB-LONCILLO.

4. **LUCUMA** Molina, Sagg. Chile 186. 1782.

Trees, or some species shrubs, the leaves mostly coriaceous, the small flowers in axillary or lateral glomerules, or solitary. Calyx-segments or sepals usually 4 or 5, strongly imbricated. Corolla urn-shaped, the tube short, the 4, 5 or 6 lobes imbricated. Stamens 4, 5 or 6, borne on the corolla-tube opposite its lobes, the filaments short or slender. Staminodia linear or filamentous, borne at the sinuses of the corolla. Ovary 2–6-celled, mostly villous; style subulate or conic. Fruit a berry, the pericarp fleshy or thin. Seeds 1–5. [Peruvian name.] Fifty species or more, mostly of tropical America, a few Australasian. Type species: *Lucuma bifer* Molina.

1. **Lucuma multiflora** A. DC. Prodr. 8: 168. 1844.

Vitellaria multiflora Radlk. Sitz. Acad. Muench. 12: 326. 1882.

Achras Acana Sessé & Moc. Fl. Mex. ed. 2, 84. 1894.

Lucuma Urbani Pierre in Urban, Symb. Ant. 5: 103. 1904.

Lucuma Stahlian Pierre in Urban, Symb. Ant. 5: 104. 1904.

A tree, becoming very tall, up to 30 m. high, the young twigs pubescent. Leaves oblong to elliptic-obovate, chartaceous or subcoriaceous, 8–30 cm. long, pinnately veined, glabrous when mature, the apex obtuse, acute or acuminate, the base narrowed or cuneate, the petioles 1–4 cm. long; pedicels 2–8 together in the axils, or sometimes solitary, 10–20 mm. long; outer sepals about 6 mm. long, rounded, puberulent; corolla 7–10 mm. long, white, its rounded lobes papillose; fruit ovoid or obovoid, 3.5–5 cm. long, 1-seeded, rarely 2-seeded.

Forests and woodlands, Porto Rico, in moist or wet districts, at lower and middle elevations; St. Croix; St. Thomas:—Saba to Trinidad. The hard, strong and durable wood is valued for furniture and used in construction. JACANA.

Lucuma macrocarpa Huber, Brazilian, was experimentally grown at the St. Croix Agricultural Experiment Station in 1923.

5. **ACHRAS** L. Sp. Pl. 1190. 1753.

A tree, with broad chartaceous leaves clustered near the ends of the twigs, and small white flowers in sessile lateral clusters below the leaves. Sepals about 10, densely imbricated in 3 or 4 series. Corolla 5-cleft, the silky lobes somewhat longer than the tube. Staminodia 5, often antheriferous. Stamens 5, opposite the corolla-lobes, the filaments subulate, the anthers cordate. Ovary 5-celled; disc villous; style conic. Fruit an oblong large 1-seeded berry. [Greek, name of a wild pear-tree.] A monotypic genus.

1. **Achras Zapota** L. Sp. Pl. 1190. 1753.

Sideroxylon sapota Jacq. Enum. 15. 1760.

Achras mammosa L. Sp. Pl. ed. 2, 469. 1762.

Lucuma mammosa A. DC. Prodr. 8: 169. 1844. Not Gaertn. f.

Calocarpum mammosum Pierre in Urban, Symb. Ant. 5: 98. 1904.

Calocarpum mammosum ovoideum Pierre, loc. cit. 99. 1904.

A tree, 10–15 m. high, the twigs stout, pubescent or villous. Leaves obovate or obovate-elliptic, strongly pinnately veined, 1.5–2.5 dm. long, glabrous, or

puberulent beneath, the apex acute, abruptly acuminate, obtuse or rounded, the base cuneate, the rather stout petioles 2–4 cm. long, often pubescent; flowers usually densely clustered on the twigs, nearly sessile; sepals rounded, silky, about 3 mm. long; corolla about 10 mm. long; fruit rugose, about 15 cm. long.

Woodlands and hillsides at lower elevations, Porto Rico, planted for its fruit and for shade, perhaps not indigenous:—Jamaica; Cuba; Hispaniola; Guadeloupe to Trinidad; continental tropical America. MAMEY SAPOTE.

6. *CHRYSOPHYLLUM* L. Sp. Pl. 192. 1753.

Unarmed evergreen trees, with alternate coriaceous leaves, and small, mostly 5-parted flowers, in axillary or lateral fascicles, the sap milky. Sepals nearly alike. Corolla-lobes unappendaged. Stamens included; staminodia none. Ovary pubescent; style short. Fruit a large or small, drupe-like berry. Seeds with a hard, often shining testa and fleshy endosperm. [Greek, referring to the lustrous pubescence on the under side of the leaves of some species.] Sixty species or more, mostly of tropical America. Type species: *Chrysophyllum Cainito* L.

Fruit 5–8 cm. in diameter, several-seeded; leaves golden-silky beneath. 1. *C. Cainito*.

Fruit 2 cm. in diameter or less, 1-seeded, rarely 2-seeded.

Leaves permanently golden-silky or brownish-silky beneath.

Leaves acute or short-acuminate.

Ovary 7–9-celled; fruit 2–3 cm. long.

Ovary 5-celled; fruit 1–2 cm. long.

Leaves bluntly long-acuminate.

Leaves finely pubescent or glabrate beneath.

Ovary 5-celled; fruit pointed, leaves very nearly glabrous.

Ovary 7–8-celled; fruit rounded; leaves silvery-silky beneath or glabrate.

2. *C. bicolor*.

3. *C. oliviforme*.

4. *C. Eggersii*.

5. *C. pauciflorum*.

6. *C. argenteum*.

1. *Chrysophyllum Cainito* L. Sp. Pl. 192. 1753.

Chrysophyllum portoricense A. DC. Prodr. 8: 157. 1844.

A tree, 10–20 m. high, the trunk up to 6 dm. in diameter, the twigs golden-silky. Leaves elliptic to oblong-elliptic, chartaceous, 5–15 cm. long, golden-silky beneath, the apex abruptly acute or obtuse, the base obtuse or narrowed, the venation widely spreading, the petioles 1.5–3 cm. long; flowers purplish-white, usually numerous in the fascicles; pedicels about 10 mm. long; sepals about 1.5 mm. long; corolla 3.5–5.5 mm. long, 5–7-lobed, the lobes about as long as the tube; ovary tomentose, 6–11-celled; stamens shorter than the corolla-lobes; fruit globose to ellipsoid, 5–8 cm. in diameter, greenish or purple, several-seeded.

Forests and hillsides, Porto Rico, planted for shade and for its fruit, and spontaneous after planting; St. Croix; St. Thomas:—Jamaica; Cuba; Hispaniola; St. Kitts to Trinidad; continental tropical America. The red-brown wood is hard, heavy, strong, tough and durable, used in construction. Its edible fruit is highly esteemed. CAIMITO. STAR-APPLE. CAINITO.

2. *Chrysophyllum bicolor* Poir. in Lam. Encycl. Suppl. 2: 15. 1811.

A tree, up to about 15 m. in height, the twigs golden-silky. Leaves elliptic, chartaceous, 5–7 cm. long, or those of young trees larger, rather dark green above, golden-silky or becoming silvery beneath, the apex bluntly short-acuminate, the base obtuse or rounded, the petioles 7–12 mm. long; fascicles few-several-flowered; pedicels 7–12 mm. long; sepals about 1.5 mm. long; corolla 4.5 mm. long, its lobes shorter than the tube; ovary 7–9-celled; fruit oblong or subglobose, 2–3 cm. long, 1-seeded, rarely 2-seeded. [*C. oliviforme* of Stahl, not of Linnaeus.]

Woodlands, northern districts of Porto Rico and near Hato Grande; St. Thomas:—Hispaniola. CAIMITILLO. LECHESILLO.

3. *Chrysophyllum oliviforme* L. Syst. ed. 10, 937. 1759.

Chrysophyllum microphyllum Jacq. Sel. Amer. Pict. 30. 1780.

Chrysophyllum monopyrenum Sw. Prodr. 49. 1788.

A tree, reaching a maximum height of about 10 m., with a trunk up to 3 dm. in diameter, the bark fissured, the young twigs brownish-pubescent. Leaves oblong to ovate, 3–10 cm. long, acutish or short-acuminate at the apex, rounded or narrowed at the base, green, glabrous and shining above, densely reddish or brownish-pubescent beneath, the petioles 8–12 mm. long; fascicles few-flowered; pedicels 5–10 mm. long; sepals silky, about 1.5 mm. long; corolla white, 4–6 mm. wide; filaments very short; ovary 5-celled; berry oval, 1–2 cm. long, purple, usually 1-seeded.

Plains and hillsides, northern and western districts of Porto Rico:—Florida; Bahamas; Jamaica; Cuba; Hispaniola. The light brown wood is hard and strong, its specific gravity about 0.94. TETA DE BURRA. SATIN-LEAF.

4. *Chrysophyllum Eggersii* Pierre in Urban, Symb. Ant. 5: 155. 1904.

A tree, 8 m. high or higher, the slender young twigs brown-silky. Leaves elliptic to oblong-lanceolate, chartaceous, 6–12 cm. long, finely brown-silky or becoming glabrate, the apex bluntly acuminate, the base rounded or narrowed, the petioles 7–10 mm. long; fascicles few-several-flowered; pedicels about as long as the petioles or shorter; calyx about 1.5 mm. long; corolla about 5 mm. long, the lobes about as long as the tube or shorter; ovary 5–8-celled; fruit unknown. [*C. microphyllum* of Eggers, not of Jacquin; (?) *C. oliviforme monopyrenum* of Eggers.]

Woods and hillsides, St. Thomas; St. Jan; St. Croix. Endemic. WILD CAJAIT.

5. *Chrysophyllum pauciflorum* Lam. Tabl. Encycl. 2: 44. 1793.

Chrysophyllum pauciflorum Krugii Pierre in Urban, Symb. Ant. 5: 159. 1904.

A tree, up to about 8 m. high, the gray bark rough, splitting into oblong, scales, the slender, nearly glabrous, branches drooping. Leaves oblong-lanceolate to ovate-elliptic, chartaceous, 4–10 cm. long, nearly glabrous, the apex acute or short-acuminate, the base obtuse or rounded, the petioles 3–8 mm. long; flowers in axillary fascicles of 2–6, or solitary; pedicels 3–12 mm. long; calyx 1.5–2 mm. long; corolla about 4 mm. long, its lobes shorter than the tube; fruit oblong, 1–2 cm. long, sharply pointed. [*Chrysophyllum Krugii* of Cook and Collins.]

Hillsides at lower elevations in the dry southern districts of Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan. Endemic. CAIMITO DE PERRO.

6. *Chrysophyllum argenteum* Jacq. Enum. 15. 1760.

Chrysophyllum glabrum Jacq. Enum. 15. 1760.

A tree, sometimes 20 m. high, usually lower, the twigs, petioles and under leaf-surfaces appressed silvery-pubescent or glabrate. Leaves elliptic to oblong, subchartaceous, 5–10 cm. long, the apex acute or short-acuminate, the base obtuse, narrowed or rounded, the petioles 8–12 mm. long; fascicles few-several-flowered, or some flowers solitary; pedicels shorter than the petioles; calyx about 2 mm. long; corolla 3–4 mm. long, its short lobes rounded; fruit ellipsoid or subglobose, 8–14 mm. long, rounded.

Woodlands, forests and hillsides, Porto Rico, at lower and middle elevations in wet or moist districts; St. Thomas; Tortola:—Cuba; Hispaniola; Saba to Trinidad. Its wood is similar to that of the Star-apple. CAIMITO VERDE.

7. *DIPHOLIS* A. DC. Prodr. 8: 188. 1844.

Evergreen, unarmed shrubs or trees, with alternate leaves, and small, mostly 5-parted, greenish, often fragrant flowers in axillary or lateral fascicles.

Sepals ovate to nearly orbicular, imbricated. Corolla rotate or funnelform, its lobes with 2 appendages at each sinus. Stamens borne on the corolla-tube, opposite the lobes, exserted, the filaments filiform, the anthers extrorse; staminodia 5, often petaloid, alternating with the stamens. Ovary glabrous, 5-celled; ovules ascending; style slender. Fruit an ovoid, subglobose or oblong berry, usually 1-seeded. Seed with a coriaceous testa, and fleshy endosperm. [Greek, referring to the appendages of the corolla.] About 10 species, natives of the West Indian region. Type species: *Achras salicifolia* L.

Fruit about 2 cm. long.

Fruit 6–10 mm. long.

Leaves oblong to oblanceolate, acute or acuminate.

Leaves obovate, rounded or obtuse.

1. *D. Bellonis*.

2. *D. salicifolia*.

3. *D. Sintenisiana*.

1. *Dipholis Bellonis* Urban, Symb. Ant. 5: 137. 1904.

Leaves ovate-oblong, 8–12 cm. long, 2.5–4 cm. wide, the apex acuminate, the base acute, the petioles 1–2 cm. long; fruiting pedicels 10–15 mm. long; fruit obovoid, about 2 cm. long, 1 cm. in diameter, violet-black. [*Dipholis montana* of Bello, not of Grisebach.]

Near Furnias, Porto Rico, according to Bello. VARITAL; TABLONCILLO. Known to us only from description by Urban.

2. *Dipholis salicifolia* (L.) A. DC. Prodr. 8: 188. 1844.

Achras salicifolia L. Sp. Pl. ed. 2: 470. 1762.

Bumelia salicifolia Sw. Prodr. 50. 1788.

A slender tree, reaching a maximum height of about 16 m., with a trunk up to 5 dm. in diameter, the bark scaly, the slender young twigs appressed-pubescent. Leaves subcoriaceous, oblong to elliptic-oblanceolate, slender-petioled, 6–12 cm. long, acute or acuminate at the apex, narrowed at the base, somewhat silky-pubescent when young, soon glabrous, dark green and shining above, dull green beneath; flower-clusters mostly shorter than the petioles; pedicels 2–3 mm. long; sepals silky-pubescent, 1.5 mm. long, ovate or oblong, obtuse; corolla about 4 mm. broad, its lobes oval, obtuse, about as long as the tube, the appendages about one-half as long; staminodia ovate, irregularly toothed; berry ovoid or subglobose, black, 6–8 mm. in diameter.

Woodlands, hillsides and arroyos, Porto Rico, at lower elevations in dry and moist districts; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Florida; West Indies south to Barbados; Yucatan. The red-brown wood is hard and strong, with a specific gravity of 0.93. ALMENDRON. BUSTIC.

3. *Dipholis Sintenisiana* Pierre in Urban, Symb. Ant. 5: 139. 1904.

A tree, recorded as reaching a maximum height of about 20 m., usually smaller, the bark smooth, the foliage dense, the slender twigs glabrous, or, when young, puberulent. Leaves obovate, or oblong-obovate, 2–6 cm. long, or those of shoots larger, subcoriaceous, faintly veined, the apex rounded, the base narrowed or cuneate, the petioles 2–4 mm. long; flowers 2–6 together in the axils on pedicels 3–5 mm. long; sepals rounded, about 2.5 mm. long; corolla about 4 mm. long; fruit oblong, green, about 10 mm. long.

Mountain forests, western and central districts of Porto Rico. Endemic. ESPEJUELO.

A tree, found on Mona Island, in foliage only, is, perhaps, of this genus (*Britton, Cowell and Hess 1699*).

8. **BUMELIA** Sw. Prodr. 49. 1788.

Shrubs or trees, the branches often spinescent, the wood very hard. Leaves sometimes clustered at the nodes. Flowers small, pedicelled, green or white, fascicled in the axils. Calyx deeply 5-parted, the sepals unequal. Corolla 5-lobed, with a pair of lobe-like appendages at each sinus, its tube short. Stamens 5, inserted near the base of the corolla-tube; anthers sagittate. Staminodia 5, petaloid. Ovary 5-celled; style filiform. Berry small, the pericarp fleshy, enclosing a single erect seed. Seed shining, the hilum at the base. [Greek, ox (large) ash.] About 35 species, natives of America. Type species: *Bumelia retusa* Sw.

Usually unarmed; pedicels 3-6 mm. long, glabrous.
Twigs armed with spines; pedicels about 1 mm. long.

1. *B. obovata*.
2. *B. Krugii*.

1. **Bumelia obovata** (Lam.) A. DC. Prodr. 8: 191. 1844.

Sideroxylon obovatum Lam. Tabl. Encycl. 2: 42. 1793.

Bumelia cuneata Sw. Fl. Ind. Occ. 496. 1797.

Bumelia obovata portoricensis Pierre & Urban; Urban, Symb. Ant. 5: 142. 1904.

A tree, 5-20 m. high, or shrubby, usually unarmed, the twigs slender, the foliage dense. Leaves obovate, oblanceolate or suborbicular, coriaceous, glabrous, 2-4 cm. long, the apex rounded, obtuse or emarginate, the base cuneate or sometimes obtuse, the venation delicate, inconspicuous, the petioles 2-5 mm. long; flowers few in the fascicles or solitary; pedicels about as long as the petioles or a little longer; calyx 1-1.5 mm. long; corolla about 3 mm. long, white; fruit subglobose or oval, green, about 6 mm. long. [? *B. retusa* of Krebs.]

Woodlands, thickets and hillsides at lower elevations near the southern coast of Porto Rico, and recorded from near Adjuntas; Mona; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda; Anegada:—Jamaica; Hispaniola; St. Martin to St. Lucia; Curaçao. The tree of Anegada has narrowly obovate or oblanceolate leaves. **BREAK BILL.**

2. **Bumelia Krugii** Pierre in Urban, Symb. Ant. 5: 146. 1904.

A much-branched shrub or a small tree 5-6 m. high, the twigs puberulent, armed with slender spines as long as the leaves or shorter. Leaves obovate to oblong, or suborbicular, coriaceous, 5-25 mm. long, puberulent or glabrate, the apex rounded, the base cuneate or obtuse, the petioles very short; fascicles few-flowered; pedicels pubescent, about 1 mm. long; sepals 1.5-2 mm. long; corolla about 3 mm. long; fruit unknown.

Coastal thickets and hillsides near the coast, southwestern dry districts of Porto Rico; Vieques. Endemic.

Bumelia nigra Stahl, Estud. 6: 56. 1888. Not Sw. 1788.

This is described as a tree with leaves silky-pubescent beneath and a globose or ovoid fruit about 3 cm. in diameter, containing 5 seeds or fewer. It has not been identified by recent botanists.

Bumelia crenulata Spreng., erroneously described as from Porto Rico, is *Ilex decidua* Walt. of the southeastern United States.

Bumelia reclinata Vent., of the southeastern United States, was listed by Krebs from St. Thomas, evidently in error.

9. **MANILKARA** [Rheede] Dubard, Ann. Mus. Col. Marseille III, 3: 6. 1915.

Evergreen milky trees, with coriaceous leaves, and lateral, axillary or terminal flowers. Sepals 6-12, in 2 series. Corolla 18-24-lobed, its tube short. Stamens borne on the corolla-tube, the filaments short, the anthers lanceolate; staminodia petal-like, toothed or lacerate. Ovary hirsute, 6-12-celled. Epicarp of the berry usually crustaceous. Seeds 1 to 8, oblique, compressed. About 40 species, mostly tropical in distribution. Type species: *Mimusops Kauki* L.

Fruit 2-3 cm. long, 1-seeded; corolla 5-6 mm. long.
Fruit 4-7 cm. long, 3-8-seeded; corolla 12-14 mm. long.

1. *M. nitida*.
2. *M. duplicata*.

1. **Manilkara nitida** (Sessé & Moc.) Dubard, Ann. Mus. Col. Marseille III. 3: 18. 1915.

Achras nitida Sessé & Moc. Fl. Mex. ed. 2, 85. 1894.
Mimusops nitida Urban, Symb. Ant. 5: 167. 1904.

A tree, up to 15 m. high or higher, the twigs rather stout, pubescent or puberulent when young. Leaves elliptic to obovate, 8-20 cm. long, glabrous or very nearly so when mature, the apex obtuse, rounded, emarginate or abruptly short-acuminate, the base narrowed, cuneate, or obtuse, the midvein prominent beneath, the lateral veins numerous and slender, the stout petioles 1-4 cm. long; flowers in axillary fascicles; pedicels 1.5-2.5 cm. long; sepals about 6 mm. long; corolla about 6 mm. long, white, deeply about 18-lobed; staminodes denticulate; berry 2-3 cm. long, smooth, 1-seeded. [*Sapota Sideroxylon* of Bello, not of Grisebach; *Mimusops Riedleana* of Cook and Collins.]

Wooded hills and forests, Porto Rico, at lower and middle elevations in wet or moist districts; St. Jan; Tortola. Endemic. The dark brown wood is hard, strong and durable with specific gravity of about 0.93. ACANA. BULLET-WOOD.

2. **Manilkara duplicata** (Sessé & Moc.) Dubard, Ann. Mus. Col. Marseille III. 3: 14. 1915.

Achras duplicata Sessé & Moc. Fl. Mex. ed. 2, 85. 1894.
Mimusops duplicata Urban, Symb. Ant. 5: 169. 1904.

A tree, up to about 20 m. in height, the young twigs pubescent. Leaves oblong to obovate, clustered near the ends of the twigs, 7-14 cm. long, silvery-puberulent beneath, shining above, the apex obtuse, acute or emarginate, the base narrowed, cuneate or rounded, the petioles 1-2 cm. long, the midvein prominent beneath, the lateral veins numerous and slender; flowers few in the fascicles or solitary; pedicels 2-3.5 cm. long; sepals 10-11 mm. long; corolla white, 12-14 mm. long, its tube about 4 mm. long; staminodes about 6 mm. long; berry 4-7 cm. long, depressed-globose, rugulose, 3-8-seeded. [*Mimusops globosa* of Grisebach, in part, not of Gaertner; *Sapota Sideroxylon* of Bello, in part, not of Grisebach; *Mimusops Pleeana* of Cook and Collins.]

Coastal thickets and river-banks in moist or wet districts, Porto Rico; Vieques. Endemic. The wood resembles that of the preceding species. SAPOTA DE COSTA. MAMEYUELO.

Mimusops Elengi L., SPANISH CHERRY, East Indian, planted on St. Thomas, is a tree 10 m. high or higher, with elliptic acuminate leaves, 7-9 cm. long, axillary white flowers, the corolla many-lobed, the yellow ovoid fruit about 2 cm. long, 1-seeded.

Family 2. **EBENACEAE** Vent.**EBONY FAMILY.**

Trees or shrubs with very hard wood, entire estipulate leaves, and dioecious polygamous, or rarely perfect, regular flowers, solitary or cymose in the axils. Calyx inferior, 3-7-lobed, commonly accrescent and persistent. Corolla gamopetalous, deciduous, 3-7-lobed, the lobes usually convolute in the bud. Stamens 2-3 times as many as the lobes of the corolla in the sterile flowers, and inserted on its tube, usually some imperfect ones in the pistillate flowers; anthers introrse, erect. Disk none. Ovary superior, several-celled; in the staminate flowers rudimentary or none; ovules 1-3 in each cavity, suspended; styles 2-8, distinct, or united below; stigmas terminal, sometimes 2-parted. Fruit a berry. Seeds oblong, the testa bony; endosperm copious, cartilaginous; embryo small, cotyledons large, foliaceous. About 6 genera and 275 species, mostly tropical.

Flowers 3-parted.

Flowers 4-6-parted.

1. *Maba*.2. *Diospyros*.1. **MABA** Forst. Char. Gen. Pl. 121. 1776.

Trees or shrubs, with alternate petioled leaves, and dioecious (rarely monoecious) axillary, solitary flowers or the staminate ones in small clusters. Calyx campanulate or tubular-campanulate, accrescent and persistent in fruit. Corolla campanulate or tubular. Staminate flowers with few or several stamens, the filaments separate or connate, the anthers oblong, or linear, the ovary rudimentary. Pistillate flowers with a usually 3-celled or 6-celled ovary, and 3 styles or a 3-cleft style, sometimes with staminodia. Fruit baccate, somewhat fleshy, or dry. Seeds 1-6, the endosperm commonly ruminated. [Tonga Islands name.] Sixty species or more, natives of tropical regions. Type species: *Maba elliptica* Forst.

1. **Maba Sintenisii** Krug & Urban, Bot. Jahrb. 15: 327. 1892.

A tree about 10 m. high, the twigs and leaves glabrous. Leaves oblong or narrowly elliptic, coriaceous, 9-16 cm. long, pinnately and finely reticulate-veined, the apex obtuse, the base narrowed, the petioles 5-7 mm. long; fruiting calyx triangular, spreading, its lobes triangular, acute, about 15 mm. wide; fruit globose, brown, about 3 cm. in diameter, 4-6-celled. The flowers of this tree are unknown.

Mountain forests, vicinity of Lares, Porto Rico. Endemic. GUAYABOTA-NISPERO. TABEIBA. The wood is dark brown, hard, heavy and strong.

Maba caribaea (A. DC.) Hieron., of Cuba and Hispaniola, with obovate rounded or emarginate leaves, was recorded by Eggers from Vieques, but we have been unable to verify this record.

2. **DIOSPYROS** L. Sp. Pl. 1057. 1753.

Trees with alternate petioled leaves, the dioecious flowers lateral, cymose, racemose or solitary, the pistillate commonly solitary, the staminate usually clustered. Calyx 4-6-cleft. Corolla 4-6-lobed. Stamens 8-20 in the sterile flowers. Styles 2-6 in the pistillate flowers; ovary globose or ovoid, its cavities twice as many as the styles. Berry large, pulpy, containing 4-12 flat hard seeds.

[Greek, Zeus' wheat.] About 160 species, widely distributed in temperate and tropical regions. Type species: *Diospyros Lotus* L.

1. *Diospyros ebenaster* Retz. Obs. 5: 31. 1789.

Diospyros revoluta Poir. in Lam. Encycl. 5: 435. 1804.

A tree, 10 m. high or higher, the bark nearly black, the young twigs puberulent. Leaves elliptic to elliptic-obovate, subcoriaceous, 6–15 cm. long, glabrous, shining, pinnately veined, the apex rounded or obtuse, the base narrowed, the rather stout petioles 5–12 mm. long; peduncles 1–2.5 cm. long; flowers white, fragrant; fruiting calyx 4-lobed, about 3 cm. broad; fruit globose, smooth, about 3 cm. in diameter.

Mountains near Toa-alta, Porto Rico, collected only by Stahl:—Montserrat; Guadeloupe; Dominica; Mexico; Brazil; Malaya. The heart wood is nearly black. GUAYABOTA.

Diospyros discolor Willd., MABOLO, native of the Philippine Islands, planted in Porto Rico and recorded as formerly spontaneous at Algarroba near Mayaguez, is a narrow tree up to 20 m. in height with leathery oblong, sharply acute leaves 2–3 dm. long, shining above, the small flowers clustered, the velvety globose fruit about 8 cm. in diameter.

Family 3. **SYMPLOCACEAE** Miers.

SWEET-LEAF FAMILY.

Trees or shrubs, with entire or dentate leaves, and regular white or yellow perfect flowers in lateral or axillary clusters. Calyx-tube completely or partly adnate to the ovary, its limb 5-lobed. Corolla 5-parted, sometimes nearly to the base, the segments imbricated. Disk none. Stamens numerous in several series; filaments usually slightly united in clusters at the base of each corolla-segment; anthers innate, laterally dehiscent. Ovary 2–5-celled; ovules commonly 2 in each cavity, pendulous; style and stigma one. Fruit a small mostly nearly dry drupe, usually with 1 oblong seed; embryo straight; endosperm fleshy. Only the following genus, comprising about 200 species, most abundant in South America.

1. **SYMPLOCOS** Jacq. Enum. 5, 24. 1760.

Characters of the family. [Greek, connected, referring to the stamens.] Type species: *Symplocos martinicensis* Jacq.

The wood of the Porto Rico species is described as nearly white, hard, moderately heavy, and strong.

Twigs and petioles hirsute; filaments united at base.

Twigs and petioles densely hirsute; corolla about 4 mm. long.

Twigs and petioles sparingly hirsute; corolla about 3 mm. long.

Twigs and petioles glabrous or puberulent; filaments connate.

Inflorescence much longer than the petioles, paniculate, many-flowered.

Inflorescence little longer than the petioles, compact, few-several flowered.

1. *S. lanata*.

2. *S. micrantha*.

3. *S. polyantha*.

4. *S. martinicensis*.

1. *Symplocos lanata* Krug & Urban, Bot. Jahrb. 15: 335. 1892.

A tree about 10 m. high, the young shoots and petioles densely hirsute with reddish hairs. Leaves elliptic to ovate-elliptic, 4–7 cm. long, hirsute beneath, glabrous and indistinctly reticulate-veined above, the apex obtuse or short-acuminate, the base obtuse, the petioles 2–5 mm. long; inflorescence glomerate,

sessile, few-flowered or flowers solitary; calyx tomentose, its lobes ovate-lanceolate, about 3 mm. long; corolla white, about 4 mm. long, its 5 or 6 lobes suborbicular; filaments united at the base, shorter than the corolla; ovary 2-celled.

Mountain forests near Adjuntas and Peñuelas, Porto Rico. Endemic. NISPERO CIMARRON.

2. *Symplocos micrantha* Krug & Urban, Bot. Jahrb. 15: 336. 1892.

A tree, 7–10 m. high or higher, the young shoots and petioles more or less pilose or hirsute. Leaves elliptic to oval, 4–9 cm. long, short-hirsute beneath, glabrous above, the apex mostly short-acuminate, the base obtuse or rounded, the petioles 5–10 mm. long; inflorescence sessile, glomerate; calyx tomentose, its ovate lobes about 2 mm. long; corolla white, nearly 3 mm. long, its lobes orbicular; filaments united below; ovary 2-celled; fruit oblong, 8–10 mm. long.

Mountain forests, Sierra de Luquillo and near Aibonito, Porto Rico. Endemic. Closely related to the preceding species.

3. *Symplocos polyantha* Krug & Urban, Bot. Jahrb. 15: 333. 1892.

A tree or shrub with short-pubescent young twigs. Leaves elliptic, oval or oval-obovate, subchartaceous, glabrous, 6–12 cm. long, the apex bluntly short-acuminate, the base subcuneate, the petioles 5–10 mm. long; inflorescence paniculate, short-pilose, many-flowered, 4–6 cm. long; flowers fragrant; pedicels very short; calyx glabrous, its suborbicular lobes 1.5–2 mm. broad; corolla about 12 mm. long, its lobes oblong-obovate; filaments connate; ovary 3–5-celled.

Woods, El Solerante, Sierra de Luquillo, at 600 m. altitude, collected only by Eggers. Endemic. PALO DE CABRA.

4. *Symplocos martinicensis* Jacq. Enum. 24. 1760.

Symplocos latifolia Krug & Urban, Bot. Jahrb. 15: 334. 1892.

A tree, 5–15 m. high, the young twigs puberulent or glabrous. Leaves oval to obovate, 6–12 cm. long, chartaceous, glabrous, the apex rather bluntly short-acuminate, subcuneate at the base, the petioles 7–15 mm. long; inflorescence compact, few-several-flowered, little longer than the petioles; calyx-lobes semi-orbicular, about 2 mm. broad; corolla white, 9–15 mm. long, its lobes oblong or obovate-oblong; filaments connate; ovary 3–5-celled; fruit oblong, 9–13 mm. long, bluish black. [? *Hopea tinctoria* of Sessé and Moçino, not of Linnaeus.]

Thickets and wooded hills, northern districts of Porto Rico; St. Thomas; Tortola:—Saba to Trinidad. ACEITUNA BLANCA.

Family 4. **STYRACACEAE** A. DC.

STORAX FAMILY.

Trees or shrubs, the flowers regular, perfect, or polygamo-dioecious; pubescence mostly stellate or lepidote. Calyx more or less adnate to the ovary. Corolla gamopetalous or polypetalous, the lobes or petals 4–8. Stamens twice as many as the lobes of the corolla or petals, or more, inserted on its tube or base, arranged in 1 series, the filaments monadelphous or 4–5-adelphous. Disk none. Ovary partly superior, 2–5-celled; ovules anatropous; style slender; stigma simple or 2–5-lobed. Fruit a berry or drupe, or often nearly dry, winged in some genera, 1-seeded, or 2–5-celled with a seed in each cavity. Endosperm copious, fleshy; embryo usually straight; cotyledons flat. About 7 genera and 75 species, mostly tropical.

1. **STYRAX** [Tourn.] L. Sp. Pl. 444. 1753.

Shrubs or small trees, with rather large, mostly white, drooping flowers, in fascicles or racemes. Calyx persistent, nearly inferior, its tube campanulate, adnate to the lower part of the ovary, its limb minutely 5-toothed. Corolla 5-parted or 5-divided. Stamens twice as many as the corolla-lobes or petals (rarely fewer); filaments flat, monadelphous below or rarely separate. Ovary nearly superior, mostly 3-celled at the base; ovules several in each cavity, ascending; stigma 3-toothed, 3-lobed or capitate. Fruit nearly dry, coriaceous or crustaceous, commonly only 1-seeded, 3-valved at the summit. [Greek name of *Storax*.] About 70 species, natives of America, Asia and southern Europe. Type species: *Styrax officinalis* L.

1. **Styrax portoricensis** Krug & Urban, Bot. Jahrb. 15: 337. 1892.

A tree, up to about 20 m. high, the twigs slender, densely lepidote. Leaves oval to elliptic-obovate, chartaceous, 7–12 cm. long, pinnately veined and reticulate, glabrous on both sides, or sparingly lepidote on the veins beneath, the apex acute or acuminate, the base narrowed, the lepidote petioles 6–10 mm. long; inflorescence axillary or lateral, lepidote, peduncled, few-flowered; flowering pedicels short; bractlets small, deciduous; calyx lepidote, about 4 mm. long; corolla-segments silvery within; fruit ellipsoid, coriaceous, pointed, 2–3 cm. long, lepidote, borne on a recurved pedicel 1–1.5 cm. long, the persistent cup-shaped calyx about 5 mm. long.

Forests of the eastern mountains of Porto Rico. Endemic.

Order 4. **GENTIANALES.**

Herbs, shrubs, vines or trees. Leaves opposite, or rarely alternate. Flowers regular. Corolla gamopetalous, rarely polypetalous, nerved, [wanting in *Forestiera* of the Oleaceae.] Stamens mostly borne on the lower part of the corolla when this is present, as many as its lobes or fewer and alternate with them. Ovaries 2, distinct, or 1 with 2 cavities (rarely more), or 2 placentae.

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| a. Stamens (usually 2) fewer than the corolla-lobes, or corolla none. | Fam. 1. OLEACEAE. |
| b. Stamens as many as the corolla-lobes. | |
| Stigmas distinct; juice not milky; ovary 1, compound. | |
| Ovary 2-celled; leaves stipulate, or their bases connected by a stipular line. | Fam. 2. LOGANIACEAE. |
| Ovary 1-celled; leaves not stipulate. | |
| Leaves opposite, rarely verticillate; corolla-lobes convolute or imbricated in the bud. | Fam. 3. GENTIANACEAE. |
| Leaves tufted or alternate; corolla-lobes induplicate-valvate in the bud; our species aquatic. | Fam. 4. MENYANTHACEAE. |
| Stigmas united; juice milky; ovaries usually 2. | |
| Styles united; stamens distinct; pollen of simple grains. | Fam. 5. APOCYNACEAE. |
| Styles distinct; stamens mostly monadelphous; pollen-grains united into waxy masses. | Fam. 6. ASCLEPIADACEAE. |

Family 1. **OLEACEAE** Lindl.

OLIVE FAMILY.

Trees or shrubs (a few genera almost herbaceous) with opposite or rarely alternate, simple or pinnate, estipulate leaves and regular 2–4-parted flowers in panicles, cymes or fascicles. Calyx inferior, usually small, sometimes

none. Corolla various, or none. Stamens 2-4; filaments separate; anthers ovate, oblong or linear, 2-celled, the sacs longitudinally dehiscent. Ovary superior, 2-celled; ovules few in each cavity, anatropous or amphitropous; style usually short or none. Fruit a capsule, samara, berry or drupe. Endosperm fleshy, horny or wanting; embryo straight, rather large; radicle usually short. About 21 genera and 525 species, of wide distribution in temperate and tropical regions.

Corolla none; fruit a drupe.

Corolla present.

Corolla deeply cleft, or petals distinct; fruit a drupe.

Corolla deeply cleft.

Petals distinct.

Corolla tubular with a spreading limb; fruit didymous.

1. *Forestiera*.

2. *Henianthus*.

3. *Mayepea*.

4. *Jasminum*.

1. *FORESTIERA* Poir. in Lam. Encycl. Suppl. 2: 664. 1812.

Shrubs or trees, with opposite deciduous simple leaves, and very small, clustered, bracted, incomplete and commonly imperfect flowers axillary or on twigs of the previous season. Calyx-tube short, the limb deeply 4-6-lobed. Corolla none (rarely of 1 or 2 small petals). Stamens 2 or 4. Ovary 2-celled; stigmas thick, sometimes 2-lobed; ovules 2 in each cavity, pendulous. Drupe commonly 1-seeded. Endosperm fleshy. [Commemorates Charles Le Forestier, a French physician.] About 10 American species. Type species: *Forestiera acuminata* (Michx.) Poir.

Leaves obtuse or acutish, entire.

Leaves acute or acuminate.

Leaves 2-5 cm. long, crenulate; twigs puberulent.

Leaves 6-8 cm. long; twigs glabrous.

1. *F. segregata*.

2. *F. Eggersiana*.

3. *F. rhamnifolia*.

1. *Forestiera segregata* (Jacq.) Krug & Urban, Bot. Jahrb. 15: 339. 1893.

Myrica segregata Jacq. Coll. 2: 273. 1788.

Adelia porulosa Michx. Fl. Bor. Am. 2: 224. 1803.

Forestiera cassinoides Poir. in Lam. Encycl. Suppl. 2: 665. 1812.

Forestiera porulosa Jacquini Eggers, Bull. U. S. Nat. Mus. 13: 68. 1879.

Adelia segregata Kuntze, Rev. Gen. Pl. 410. 1891.

A shrub, or a small tree up to 7 m. high and a trunk diameter of 1.5 dm., the branches slender, glabrous. Leaves rather firm in texture, oblong to lanceolate or obovate, 1.5-6 cm. long, obtuse or acutish at the apex, narrowed at the base, entire, shining above, pale and reticulate-veined beneath, punctate when dry, short-petioled; flowers yellowish green; drupes oblong to oval, 6-10 mm. long, short-pedicelled, purplish, the stone longitudinally ribbed.

Hillsides and cliffs in the dry southern and southwestern districts of Porto Rico; Vieques; St. Croix; Tortola:—Florida; Bermuda; Jamaica; Cuba; Hispaniola. INK-BUSH.

2. *Forestiera Eggersiana* Krug & Urban, Bot. Jahrb. 15: 339. 1893.

A shrub 3 m. high or less, or a tree 5 m. high, the slender young twigs puberulent. Leaves ovate to oblong-lanceolate, glabrous, chartaceous, 2-5 cm. long, crenulate or nearly entire, bright green above, pale beneath, punctate when dry, the apex bluntly acute or acuminate, the base narrowed, the petioles 2-3 mm. long; drupe narrowly oblong, 8-12 mm. long.

Thickets, Culebra; Vieques; St. Thomas; St. Jan; Virgin Gorda. Endemic.

3. *Forestiera rhamnifolia* Griseb. Cat. Pl. Cub. 169. 1866.

A tree, 5-10 m. high or shrubby, the twigs glabrous. Leaves oval or elliptic, chartaceous or submembranous, 6-8 cm. long, glabrous, serrulate above or entire,

the apex acute or acuminate, the base narrowed, the under side pale green, punctate when dry, the upper bright green, the petioles 4–8 mm. long; drupe ellipsoid, pointed at both ends, 8–10 mm. long. [*Drypetes laevigata* of Millspaugh.]

Bluffs of Salt River, St. Croix:—Jamaica; Cuba; Guadeloupe; Martinique; Grenada.

2. **HAENIANTHUS** Griseb. Fl. Br. W. I. 405. 1861.

Shrubs or trees, with opposite entire coriaceous or chartaceous leaves, the flowers in panicles. Calyx 4-toothed. Corolla deeply 4-cleft, the tube short, the segments linear, fleshy, cylindric, or laterally flattened. Stamens 2. Ovary 2-celled; style short; stigma slightly emarginate; ovules 2 in each cavity, anatropous. Fruit an ovoid or subglobose drupe, 1-seeded. Seed with a thin testa, cartilaginous endosperm and flat cotyledons. [Greek, taken from *Chionanthus*.] Three known West Indian species. Type species: *Chionanthus incrassatus* Sw.

1. **Haenianthus obovatus** Krug & Urban, Bot. Jahrb. 15: 342. 1892.

A branching shrub, 3–5 m. high, or a small tree about 6 m. high, the twigs and leaves glabrous. Leaves obovate, chartaceous or subcoriaceous, 4–7 cm. long, the apex obtuse, the base, cuneate, the slender petioles 1–2 cm. long; panicles terminal, several-many-flowered; pedicels 3–6 mm. long; calyx about 1 mm. long; corolla-segments white, 5–6 mm. long; drupe about 2 cm. long.

Endemic on the summits of the eastern mountains of Porto Rico.

3. **MAYEPEA** Aubl. Pl. Guian. 1: 81. 1775.

Trees or shrubs, with opposite entire leaves, the rather large, mostly white, bracteolate flowers usually paniced. Calyx small, 4-cleft or 4-toothed. Petals 4, distinct or very nearly so, narrow. Stamens 2, rarely 4, borne at the bases of the petals; filaments short; anthers ovate to linear. Ovary 2-celled; ovules 2 in each cavity; style short; stigma oblong to globose. Fruit a small oblong drupe, with thin flesh and hard endocarp. [Guiana name.] About 50 species, natives of tropical regions. Type species: *Mayepea guianensis* Aubl.

Calyx glabrous or the margin ciliate; panicles terminal or also axillary.

Calyx pilose or tomentulose; panicles axillary.

Leaves chartaceous, 8–15 cm. long; panicles large, much longer than the petioles.

Leaves coriaceous, 7 cm. long or less; panicles short, dense, about twice as long as the petioles.

1. *M. domingensis*.

2. *M. caribaea*.

3. *M. axilliflora*.

1. **Mayepea domingensis** (Lam.) Krug & Urban, Bot. Jahrb. 15: 344. 1892.

Chionanthus domingensis Lam. Tabl. Encycl. 1: 30. 1791.

Linociera latifolia Vahl, Enum. 1: 46. 1804.

Linociera domingensis Knobl. Bot. Centr. 61: 87. 1895.

A tree, 10–18 m. high, the trunk up to about 7 dm. in diameter, the bark smooth and gray, the slender twigs glabrous or nearly so. Leaves oval or elliptic-lanceolate, chartaceous, glabrous, slender-petioled, 15 cm. long or less, the apex acuminate, the base narrowed, the petioles 2–3 cm. long; panicles stalked, terminal or also axillary, glabrous or sparingly pubescent, as long as the leaves or shorter, many-flowered; pedicels 2 mm. long or less; calyx glabrous or nearly so; petals flat, 15–22 mm. long; drupe oval, 15–20 mm. long. [*Linociera com-*

pacta of Bello and of Stahl, not of R. Brown; *Drypetes glauca* of Bello, not of Vahl.]

Wooded hills and forests, Porto Rico, in wet or moist districts:—Jamaica; Cuba; Hispaniola. The wood is light in color and hard. HUESO BLANCO. HUESILLO.

2. *Mayepea caribaea* (Jacq.) Kuntze, Rev. Gen. Pl. 411. 1891.

Chionanthus caribaea Jacq. Coll. 2: 110. 1788.

Chionanthus compacta Sw. Prodr. 13. 1788.

Linociera caribaea Knobl. Bot. Centr. 61: 84. 1895.

A tree, 5–12 m. high, or shrubby, the young twigs and inflorescence short-pilose. Leaves oblong to elliptic-lanceolate, chartaceous, glabrous, 8–15 cm. long, the apex acuminate, the base narrowed, the petioles 15 mm. long or less; panicles axillary, peduncled, as long as the leaves or shorter, several-flowered, the flowers sessile or nearly so; calyx densely pilose; petals flat, white, 8–24 mm. long; drupe oval, 15–25 mm. long.

Hillsides, eastern districts of Porto Rico; Culebra; Vieques; St. Croix; St. Thomas:—Hispaniola; St. Martin to Trinidad; Margarita; Venezuela. AVISPILLO.

3. *Mayepea axilliflora* (Griseb.) Krug & Urban, Bot. Jahrb. 15: 345. 1892.

Linociera axilliflora Griseb. Mem. Am. Acad. II. 8: 519. 1862.

A shrub or small tree, the twigs and inflorescence tomentulose or glabrate. Leaves oblong to elliptic, coriaceous, glabrous, 4–7 cm. long, the apex acute or obtuse, the base narrowed, the petioles only about 6 mm. long; panicles axillary, few-several-flowered, compact, about twice as long as the petioles; calyx tomentulose; petals flat, about 7 mm. long; fruit unknown.

Woodlands, Monte Mariel near Guanica:—Cuba. The generic position of this plant is not certainly determined.

4. *JASMINUM* L. Sp. Pl. 7. 1753.

Shrubs or woody vines, with mostly opposite, simple or compound leaves, and large, clustered or solitary flowers. Calyx lobed or parted. Corolla salverform, its tube cylindric, its limb lobed or parted, the lobes imbricated. Stamens 2, included; filaments short; anthers laterally dehiscent. Ovary 2-celled; style very slender; stigma capitate or 2-lobed; ovules mostly 2 in each cavity. Fruit didymous, fleshy. Seeds without endosperm. [Ancient name, of Arabic origin.] About 100 species, natives of the Old World. Type species: *Jasminum officinale* L.

Leaves simple; shrubs.

Calyx-lobes glabrate; corolla-lobes obtuse.

Calyx-lobes densely pilose; corolla-lobes acute.

Leaves compound.

Leaves 3-foliolate; vine.

Leaves pinnate; vine-like shrub.

1. *J. Sambac*.

2. *J. pubescens*.

3. *J. azoricum*.

4. *J. grandiflorum*.

1. *Jasminum Sambac* (L.) Soland.; Ait. Hort. Kew 1: 8. 1789.

Nyctanthes Sambac L. Sp. Pl. 6. 1753.

A shrub, 1–2 m. high, the young shoots sparingly pubescent. Leaves simple, ovate to elliptic, membranous, deciduous, 3–7 cm. long, acute, obtuse, or short-acuminate at the apex, rounded or obtuse at the base, glabrous and finely reticulate-veined on both sides, the pubescent petioles 3–6 mm. long; cymes peduncled, terminal, few-several-flowered, pubescent; pedicels 6–12 mm. long; calyx-segments numerous, linear, glabrous or sparingly pubescent, about 1 cm.

long; corolla white, fragrant, its tube somewhat longer than the calyx, its limb about 2 cm. wide, the lobes obtuse. [*Jasminum quinqueflorum* Heyne.]

Spontaneous after planting in Porto Rico; St. Croix:—widely planted for ornament in the West Indies, the flowers often double. Native of the East Indies. JASMIN OLOROSO. DIA MELA. ARABIAN JASMINE.

2. *Jasminum pubescens* (Retz.) Willd. Sp. Pl. 1: 37. 1798.

Nyctanthes pubescens Retz. Obs. 5: 9. 1789.

A shrub 1–2 m. high, with elongated densely tomentose branches. Leaves simple, rather thin, ovate, 3–7 cm. long, glabrate above, pubescent beneath, the apex acute, the base cordate or subtruncate, the densely pubescent petioles 4–6 mm. long; cymes sessile or nearly so, dense, few-several-flowered; flowers white, nearly sessile; calyx-segments numerous, linear, densely pilose, about 1 cm. long; corolla-tube about twice as long as the calyx, the limb 2–2.5 mm. wide, its lobes acute. [*Jasminum hirsutum* of Krebs.]

Spontaneous after planting; locally naturalized along roads and in fields, Porto Rico; Vieques; St. Croix; St. Thomas:—widely planted for ornament in the West Indies. Native of southeastern Asia. JASMIN DE PAPEL. HAIRY JASMINE.

3. *Jasminum azoricum* L. Sp. Pl. 7. 1753.

A slender vine, up to 4 m. long or longer, the slender terete twigs, the petioles and inflorescence-branches tomentose, the branches glabrous. Leaves 3-foliolate; leaflets ovate, glabrate, broad, 3–6 cm. long, the apex acute or obtuse, the base subtruncate or narrowed, the terminal one long-stalked, the lateral ones short-stalked, the petioles 1–2 cm. long; cymes loosely several-flowered; flowers short-pedicelled; calyx only about 3 mm. long, its teeth very short; corolla white, its slender tube about 2 cm. long, its oblong acute lobes about 1 cm. long.

River-thickets, vicinity of Coamo Springs; escaped from cultivation—widely distributed through cultivation in the West Indies; planted for ornament in Porto Rico and the Virgin Islands. Native of the Azores and Canary Islands.

4. *Jasminum grandiflorum* L. Sp. Pl. ed. 2, 9. 1762.

A nearly glabrous vine-like shrub, the slender weak branches 3–4 m. long. Leaves pinnate, short-petioled, 6–15 cm. long; leaflets 5 or 7, elliptic or ovate, 1–2.5 cm. long, short-stalked, the lateral ones mostly obtuse and mucronate, the terminal one acute or acuminate; cymes peduncled, corymb-like, several-flowered; pedicels very slender, 1–2.5 cm. long; calyx-tube short, the 4 or 5 filiform lobes about 1 cm. long or less; corolla-tube about 2.5 cm. long, the limb about 2 cm. broad, the oblong lobes obtuse. [*Jasminum officinale* of Stahl and of Mills-paugh, not of Linnaeus.]

Occasionally spontaneous after planting in Porto Rico; St. Croix; St. Thomas:—widely planted for ornament in the West Indies. Native of southern Asia. JASMIN. ROYAL JASMINE.

Jasminum officinale L., POET'S JASMINE, Asiatic, cultivated for ornament on St. Thomas, is vine-like, the pinnate leaves with acute leaflets, the white flowers in loose cymes, the corolla-lobes acute.

Jasminum humile L., ITALIAN YELLOW OR NEPAUL JASMINE, Asiatic, planted for ornament in the Virgin Islands, is vine-like, glabrous, the pinnate leaves with usually 5 ovate or lanceolate acute leaflets, the bright yellow slender-pedicelled flowers in terminal cymes, the corolla about 2.5 cm. long, its lobes obtuse. [*Jasminum revolutum* Sims.]

Jasminum arborescens Roxb., East Indian, was included in the list of plants of St. Thomas by Krebs; it may have been planted there.

Olea europaea L., OLIVE, European, planted on St. Thomas, is an evergreen tree, becoming 20 m. high or higher, with oblong-lanceolate leathery leaves 3–8 cm. long, dark green above, silvery lepidote beneath; the small white flowers are in axillary panicles shorter than the leaves; the well-known fruit is an oblong or subglobose drupe.

Family 2. **LOGANIACEAE** Dumort.

LOGANIA FAMILY.

Herbs, shrubs, vines or some tropical genera trees, with opposite or verticillate simple stipulate leaves, or the leaf-bases connected by a stipular line or membrane, and regular perfect 4–5-parted flowers. Calyx inferior, the tube campanulate, sometimes short or none, the segments imbricated, at least in the bud. Corolla gamopetalous, funnelform, campanulate or rarely rotate. Stamens inserted on the tube or throat of the corolla; anthers 2-celled, the sacs longitudinally dehiscent; pollen-grains simple. Disk usually none. Ovary superior, 2-celled (rarely 3–5-celled); ovules anatropous or amphitropous. Fruit a capsule in our species. Embryo small, usually straight; endosperm copious; radicle terete or conic. About 30 genera and 400 species, widely distributed in warm and tropical regions.

Corolla funnelform or salverform; styles united.
Corolla urn-shaped; styles soon distinct.

1. *Spigelia*.
2. *Cynoctonum*.

1. **SPIGELIA** L. Sp. Pl. 149. 1753.

Herbs, with opposite membranous entire, pinnately veined leaves, small stipules, or the leaf-bases connected by a stipular line, and red yellow, nearly white or purple flowers, in scorpioid cymes or unilateral spikes, or terminal and in the forks of the branches. Calyx deeply 5-parted. Corolla 5-lobed, the tube finely 15-nerved. Stamens 5, inserted on the corolla-tube; anthers 2-lobed at the base. Ovules numerous, on peltate placentae; style filiform, jointed near the middle; stigma obtuse. Capsule didymous, 2-celled, somewhat flattened contrary to the dissepiment, circumscissile, the 2 carpels becoming 2-valved. Seeds peltate, not winged. [Named for Adrian von der Spigel, 1558–1625, physician.] About 35 species, all American. Type species: *Spigelia Anthelmia* L.

1. **Spigelia Anthelmia** L. Sp. Pl. 149. 1753.

Annual, simple or branched, 5 dm. high or less. Leaves lanceolate, 3–10 cm. long, acute or acuminate, pale beneath, finely ciliolate; inflorescence subtended by a whorl or pair of lanceolate or ovate bracts larger than the leaves; flowers small, in slender unilateral spikes 5–12 cm. long; calyx-lobes narrowly lanceolate, about 2 mm. long; corolla purplish white, 5–9 mm. long; capsules 5–6 mm. broad, tubercled.

Fields, waste and cultivated grounds, Porto Rico, at lower elevations in moist districts; St. Croix; St. Thomas:—Florida; West Indies; continental tropical America. LOMBRICERA. SPIGELIA. WATERWEED. WORM-GRASS.

2. **CYNOCTONUM** J. F. Gmel. Syst. 443. 1791.

Herbs, our species annual, with opposite entire leaves, and minute stipules, or the leaf-bases connected by a stipular line. Flowers small, whitish, in one-sided spikes forming cymes. Calyx 5-parted. Corolla urn-shaped, 5-lobed. Stamens 5, included; filaments short; anthers cordate. Ovules numerous, on

peltate placentae; style short, 2-divided below, united above by the common stigma, the divisions becoming separate. Capsule 2-lobed at the summit; carpels divaricate, dehiscent along the inner side. Seeds numerous, small, tuberculate. [Greek, dog-killing.] About 5 species, of warm and tropical regions. Type species: *Cynoctonum sessilifolium* Gmel.

1. *Cynoctonum Mitreola* (L.) Britton, Mem. Torr. Club 5: 258. 1894.

Ophiorrhiza Mitreola L. Sp. Pl. 150. 1753.

Mitreola petiolata T. & G. Fl. N. A. 2: 45. 1841.

Stem glabrous, erect, terete, 3–6 dm. high. Leaves lanceolate to ovate, petioled, 2.5–8 cm. long, 6–25 mm. wide, acute at both ends, glabrous; cymes terminal and often also in the upper axils, slender-peduncled; flowers about 2 mm. broad, numerous, sessile or nearly so; capsule deeply 2-lobed, compressed, the lobes at length widely diverging, acute. [*Lisianthus chelonoides* of Bello, not of Linnaeus.]

Wet open grounds, Porto Rico, at lower elevations:—southeastern United States; West Indies; Mexico. MITREWORT.

Buddleia Davidi Franchet, Chinese, grown in Porto Rico mountain gardens under the name **HELIOTROPO**, is a shrub about 1 m. high, with opposite thin, short-petioled, oblong-lanceolate leaves about 7 cm. long, the lilac flowers in terminal narrow panicles.

Strychnos spinosa Lam., Madagascan, received by the Forest Station at Rio Piedras from the Bureau of Plant Industry as seedlings in December, 1921, had attained a height of nearly two meters by April, 1923.

Family 3. **GENTIANACEAE** Dumort.

GENTIAN FAMILY.

Bitter mostly glabrous herbs, with opposite (rarely verticillate) estipulate entire leaves, reduced to scales in *Leiphaïmos*, and regular perfect flowers in clusters, or solitary at the ends of the stem or branches. Calyx inferior, persistent, 4–12-lobed, -toothed, or -divided (of 2 sepals in *Obolaria*), the lobes imbricated or not meeting in the bud. Corolla gamopetalous, often marcescent, 4–12-lobed or -parted. Stamens as many as the lobes of the corolla, alternate with them, inserted on the tube or throat; anthers 2-celled, longitudinally dehiscent. Disk none, or inconspicuous. Ovary superior in our genera, 1-celled or partly 2-celled; ovules numerous, anatropous or amphitropous; stigma entire, or 2-lobed or 2-cleft. Capsule mostly dehiscent by 2 valves. Endosperm fleshy, copious; embryo small, terete or conic. About 70 genera and 700 species, widely distributed.

Herbs or shrubs with chlorophyll, the leaves normal.

Flowers glomerate in the axils of the leaves; anthers horned.

Flowers not glomerate in the axils; anthers without horns.

Calyx-tube as long as the lobes or longer, conspicuously ribbed or winged.

Calyx-tube much shorter than the lobes, scarcely winged.

Corolla-tube as long as the calyx or shorter.

Corolla-tube much longer than the calyx.

Low herbs without chlorophyll; leaves reduced to scales.

1. *Enicostema*.

2. *Schultesia*.

3. *Centaurium*.

4. *Lisianthus*.

5. *Leiphaïmos*.

1. **ENICOSTEMA** Blume, Bijdr. 848. 1826.

A perennial herb, with opposite sessile lanceolate to linear-lanceolate leaves, and small flowers glomerate in the axils. Calyx narrowly campanulate, deeply

5-cleft. Corolla nearly funnelform, the cylindric tube somewhat enlarged above the middle, the 5 lobes contorted, spreading. Stamens 5, borne on the corolla-tube, included, the filaments filiform; anthers oblong, erect, the connective apiculate. Ovary 1-celled; style short; stigma globose. Capsule oblong, 2-valved. Seeds many, globose. [Greek, included stamens.] A monotypic genus. Type species: *Enicostema littorale* Blume.

1. **Enicostema verticillatum** (L.) Gilg. in E. & P. Nat. Pfl. 4²: 67. 1895.

Gentiana verticillata L. Syst. ed. 10, 952. 1759.

Enicostema littorale Blume, Bijdr. 848. 1826.

Slevogtia occidentalis Griseb. in DC. Prodr. 9: 65. 1845.

Branched, often from the base, leafy, glabrous, 3–10 dm. high. Leaves acuminate at the apex, narrowed at the base, 3-nerved, 4–10 cm. long; glomerules several-flowered; calyx-segments linear-lanceolate, about 5 mm. long; corolla white, about 6 mm. long; capsule about as long as the calyx.

Recorded in 1845 by Grisebach from Porto Rico, otherwise known to us only from Antigua to Trinidad and from the Old World tropics, although recorded also from Cuba and Hispaniola.

2. **SCHULTESIA** Mart. Nov. Gen. 2: 103. 1826.

Annual erect herbs, with opposite sessile leaves and rather large flowers at the ends of the branches. Calyx tubular, 4-ribbed or 4-winged, 4-cleft, the tube as long as the lobes or longer. Corolla funnelform, the tube narrowed above, the limb 4-lobed, the lobes contorted. Stamens 4, borne on the corolla-tube; anthers oblong. Ovary 1-celled; style filiform; stigma 2-lamellate. Capsule 2-valved. Seeds small, foveolate. [Commemorates J. A. Schultes, 1773–1831, Austrian botanist.] About 17 species in tropical America, 1 in tropical Africa. Type species: *Schultesia crenuliflora* Mart.

1. **Schultesia heterophylla** Miquel, Linnaea 19: 137. 1847.

Erect, glabrous, simple or few-branched above, 2–4 dm. high. Leaves lanceolate or linear-lanceolate, 1–5 cm. long, acute or obtuse; flowers solitary or 2 or 3 at the ends of the stem and branches; calyx 2–3 cm. long, narrowly 4-winged, the linear-subulate lobes about one-half as long as the tube; corolla pink or purple, 3–4 cm. long, its lobes shorter than the tube. [*S. stenophylla* of Stahl, not of Martius.]

Wet sand near Bayamon, collected only by Stahl:—Cuba, Hispaniola; continental tropical America; recorded by Grisebach from Jamaica.

• 3. **CENTAURIUM** Hill, Brit. Herbal 62. 1756.

Herbs, mostly annual or biennial, with sessile or amplexicaul leaves, and pink white or yellow flowers in cymes or spikes. Calyx tubular, 5–4-lobed or -divided, the lobes or segments narrow, keeled. Corolla salverform, 5–4-lobed, the lobes spreading, contorted, convolute in the bud. Stamens 5 or 4, inserted on the corolla-tube; filaments short-filiform; anthers becoming spirally twisted. Ovary 1-celled, the placentae sometimes intruded; style filiform; stigma 2-lobed. Capsule 2-valved. Seed-coat reticulated. [Latin, 100 gold pieces, referring to supposed medicinal value.] About 25 species, both in the Old World and the New. Type species: *Gentiana Centaurium* L.

1. **Centaurium Brittonii** Millsp. & Greenm. Field Mus. Bot. 2: 308. 1909.

Annual, glabrous, much-branched, 5–18 cm. high, the branches very slender, quadrangular. Basal and lower leaves obtuse or oblong-spatulate; upper leaves sessile, oblong-lanceolate to linear, acute, 1.8 cm. long or less; peduncles nearly filiform, much longer than the upper leaves; flowers white with a yellowish eye, 3–5-parted (mostly 4-parted); calyx 5–6 mm. long, its segments narrowly linear, acute; corolla 6–10 mm. long, its lobes about one-half as long as the tube; capsule linear-elliptic, 6–8 mm. long.

Shaded saline soil, West End, Anegada:—Bahamas; Cuba; Venezuela.

4. **LISIANTHUS** L. Mant. 1: 6, 43. 1767.

Glabrous herbs or shrubs with opposite leaves, and large, mostly yellow, corymbose flowers. Calyx-tube much shorter than the 5-lobes. Corolla nearly salverform, or funnelform, with 5 spreading lobes. Stamens 5, borne on the lower part of the corolla-tube; filaments filiform; anther oblong. Ovary 1-celled; style filiform; stigma subcapitate; capsule enclosed by the withering corolla, 2-valved. Seeds mostly tubercled or muricate. [Greek, glossy flower.] About 15 species, of tropical America. Type species: *Lisianthus longifolius* L.

1. **Lisianthus laxiflorus** Urban, Symb. Ant. 3: 332. 1902.

Lisianthus gracilis Perkins, Bot. Jahrb. 31: 492. 1902. Not Griseb. 1861.

Shrubby, branched, 1 m. high or less, the branches slender, terete. Leaves lanceolate to elliptic-lanceolate, membranous, 4–12 cm. long, the apex acuminate, the base narrowed, the petioles 1.5–6 mm. long; corymbs loosely few-flowered; their branches very slender; pedicels about 3 cm. long or shorter, nearly filiform; calyx about 12 mm. long; its tube about 2 mm. long, its linear-lanceolate lobes erect; corolla yellow, 3–4 cm. long, funnelform, its tube about 2 cm. long, its oblong-lanceolate lobes acuminate; capsule narrowly oblong, 10–15 mm. long; pointed; seeds tuberculate, brown. [*Leianthus longifolius gracilis* of Bello, not of Grisebach.]

Woods and forests at lower and middle altitudes in moist districts of Porto Rico. Endemic. CAMPANILLA.

5. **LEIPHAIMOS** Schl. & Cham. Linnaea 6: 387. 1831.

Small glabrous saprophytic pale simple-stemmed herbs, without chlorophyll, the stems white or yellowish, bearing opposite sessile scales or the lower scales alternate, the flowers terminal, cymose or solitary. Calyx bracteolate at the base, 4–5-toothed or -cleft. Corolla salverform or funnelform, 4–5-lobed, mostly small. Stamens 4 or 5, included; filaments mostly short; anthers introrse. Ovary 1-celled, with 2 parietal placentae; style one; stigma capitate or dilated. Capsule oblong or linear, septicidally dehiscent at the middle. [Greek, pallid.] About 20 species, mostly of tropical America. Type species: *Leiphaimos parasitica* Schl. & Cham.

Corolla yellow; stems yellow.
Corolla blue; stems white.

1. *L. aphylla*.
2. *L. portoricensis*.

1. **Leiphaimos aphylla** (Jacq.) Gilg. in E. & P. Nat. Pfl. 4²: 104. 1895.

Gentiana aphylla Jacq. Enum. 17. 1760.

Voyria uniflora Lam. Tabl. Encycl. 1: 491. 1791.

Stem simple, erect, yellow, with one terminal flower, and bearing several distant sessile scales about 2 mm. long. Calyx 5-cleft, much shorter than the

corolla, its lanceolate lobes acuminate; corolla yellow, its slender tube 2–3 cm. long, its 5 oblong-lanceolate lobes about 6 mm. long, spreading; capsule narrowly oblong, 1–1.5 cm. long.

In the leaf-mould of mountain forests, Porto Rico:—Jamaica (?); Cuba; Saba to Trinidad; continental tropical America.

2. *Leiphalmos portoricensis* Britton, sp. nov.

Stems weak, simple, 1.5 dm. long or shorter, white, with one terminal flower and a few distant sessile translucent scales. Calyx 5-cleft, about 3 mm. long, its linear-lanceolate segments acute; corolla blue, 6–8 mm. long, its lobes short; capsule oblong, about 1 cm. long.

Mountain forest, Indiera Fria, near Maricao, Porto Rico (*Britton, Cowell and Brown 4473*).

Family 4. MENYANTHACEAE G. Don.

BUCKBEAN FAMILY.

Perennial aquatic or marsh herbs, with basal or alternate leaves, and clustered regular perfect flowers. Calyx inferior, deeply 5-parted, persistent. Corolla 5-lobed or 5-cleft, the lobes induplicate-valvate, at least in the bud. Stamens 5, borne on the corolla, and alternate with its lobes; anther-sacs longitudinally dehiscent; pollen-grains 3-angled. Ovary 1-celled, the 2 placentae sometimes intruded. Fruit a capsule, or indehiscent. Five genera and about 35 species, widely distributed.

1. *NYMPHOIDES* Hill, Brit. Herbal 77. 1756.

[*LIMNANTHEMUM* S. G. Gmel. Nov. Act. Acad. Petrop. 14: 527. 1769.]

Aquatic herbs, with rootstocks. Leaves petioled, ovate or orbicular, entire or repand, or the primary ones different; flowers yellow, or white, umbellate at the summit of stems at the bases of the petioles, or axillary. Calyx 5-parted. Corolla nearly rotate, deeply 5-cleft, the lobes induplicate-valvate in the bud, sometimes fimbriate on the margins. Stamens 5, inserted on the base of the corolla; anthers sagittate, versatile. Ovary 1-celled; style short or none; stigma 2-lamellate. Capsule indehiscent or irregularly bursting [Greek, resembling *Nymphaea*.] About 20 species, widely distributed. Type species: *Nymphoides flava* Hill.

1. *Nymphoides Humboldtianum* (H.B.K.) Kuntze, Rev. Gen. Pl. 429. 1891.

Villarsia Humboldtiana H.B.K. Nov. Gen. 3: 187. 1818.

Limnanthemum Humboldtianum Griseb. Gen. & Sp. Gent. 347 1839.

Glabrous; roots elongated, numerous. Stems stout, about 4 dm. long or less; leaves solitary, orbicular or reniform-orbicular, rather fleshy, deeply cordate, 3–12 cm. broad; short-petioled; flowers in a sessile umbel at the base of the petiole; pedicels few or many, slender, 3–10 cm. long, deflexed in fruit; calyx-segments linear-lanceolate, about 8 mm. long; corolla bright white, its segments fimbriate, about twice as long as the calyx, recurved; capsule somewhat shorter than the calyx; seeds numerous, smooth, globose. [*Menyanthes indica* of Sessé and Moçino, not of Linnaeus.]

Wet sandy soil and in lagoons, northern coastal plain and near Humacao, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; continental tropical America. WATER SNOWFLAKE.

Family 5. **APOCYNACEAE** Lindl.

DOGBANE FAMILY.

Perennial herbs, shrubs, vines, or some tropical genera trees, mostly with an acrid milky juice, with simple estipulate leaves, and perfect regular 5-parted flowers. Calyx inferior, persistent, the lobes imbricated in the bud. Corolla gamopetalous, its lobes convolute in the bud and often twisted. Stamens as many as the lobes of the corolla, alternate with them, inserted on the tube or throat; anthers 2-celled; pollen-grains simple. Ovary superior, or its base adherent to the calyx, of 2 distinct carpels, or 1-celled with 2 parietal placentae, or 2-celled; ovules anatropous or amphitropous; style simple, or 2-divided; stigma simple. Fruit usually of 2 follicles or drupes, sometimes of a simple drupe or capsule. Seeds often appendaged; endosperm fleshy; embryo straight; radicle terete, usually shorter than the cotyledons. About 130 genera and 1100 species, very widely distributed, mostly in tropical regions.

A. Anthers free from the stigma, their sacs without basal appendages.

1. Carpels united; fruit 1-celled, capsular, echinate.
2. Carpels distinct (partly united in some species of *Rauwolfia*).

1. *Allamanda*.

a. Seeds many in each carpel.

Fruit dry, follicular, elongated.

Seeds in many rows; trees.

Seeds in only 2 rows; herbs.

Fruit fleshy or coriaceous, short.

b. Seeds only 2 or 4 in each carpel.

Fruit follicular or drupaceous; leaves opposite or verticillate.

Fruit follicular, armed with hooked bristles; vine.

Fruit short, smooth, drupaceous; shrubs or trees.

Fruit a compressed drupe, wider than long; tree with linear alternate leaves.

B. Anthers attached to the stigma, their sacs with basal prolongations; vines; fruit follicular.

1. Anthers included; flowers large.

Corolla-tube subcylindric.

Corolla-tube funnelform.

Calyx glandless.

Calyx many-glandular.

2. Anthers exerted; flowers small.

2. *Plumiera*.3. *Catharanthus*.4. *Tabernaemontana*.5. *Anechites*.6. *Rauwolfia*.7. *Cerbera*.8. *Echites*.9. *Rhabdadenia*.10. *Urechites*.11. *Forsteronia*.1. **ALLAMANDA** L. Mant. 2: 214. 1771.

Shrubs, trees or woody vines, with opposite or verticillate leaves and large flowers in terminal clusters. Calyx 5-parted, the segments lanceolate. Corolla funnelform, the tube cylindric, the throat campanulate, bearing ciliate scales within, the 5 broad lobes sinistrorse. Stamens borne on the throat of the corolla; filaments short; anthers lanceolate, free from the stigma, their sacs not appendaged. Ovary 1-celled; style filiform; stigma with a basal reflexed annular membrane. Capsule compressed, ovate, echinate. Seeds compressed, margined or winged. [In honor of F. Allamand, professor in Leyden.] About 12 species, the following typical.

1. **Allamanda cathartica** L. Mant. 2: 214. 1771.

Echites verticillata Sessé & Moç. Fl. Mex. ed. 2, 39. 1894.

A shrub, 1-2.5 m. high, the twigs more or less pilose. Leaves verticillate in 3's or 4's or the upper opposite, oblong or oblanceolate, subchartaceous, short-petioled, 5-12 cm. long, glabrous above, pilose on the stronger veins beneath, the apex acuminate, the base narrowed; racemes irregularly several-flowered;

calyx-segments oblong-lanceolate, 10–16 mm. long; corolla yellow, 7–9 cm. long, the cylindric part of the tube 2–3 cm. long, the limb 6–8 cm. broad, the lobes broad and rounded; capsule suborbicular, densely prickly, 4–6 cm. broad, the prickles 7–15 mm. long.

Banks, hillsides and along roads, Porto Rico, Vieques and St. Thomas, mostly spontaneous after cultivation; doubtfully native:—widely distributed in the West Indies (except Bahamas) and in continental tropical America, and much planted for ornament; introduced into the Old World tropics. CANARIO. CANTIVA. ALLAMANDA.

Allamanda Hendersoni Bull., a woody vine, planted for ornament in Porto Rico and the Virgin Islands, has foliage similar to that of *A. cathartica* but much larger flowers.

2. *PLUMIERA* L. Sp. Pl. 209. 1753.

Trees or shrubs, with very stout branches, copious milky sap, alternate petioled feather-veined leaves, and large bracted flowers in terminal peduncled cymes. Calyx small, fleshy, 5-cleft, eglandular. Corolla salverform, the tube subcylindric, the 5 lobes sinistorse. Stamens borne near the base of the corolla-tube, included; anthers obtuse, their sacs unappendaged. Carpels 2, distinct; ovules many in each carpel; style very short; stigma oblong, not annulate, obtusely 2-lobed at the apex. Follicles 2, coriaceous, usually linear and divaricate, many-seeded. Seeds flat, winged, the endosperm fleshy. [Commemorates Charles Plumier, a distinguished French botanist, born 1646.] About 45 species, of tropical America. Type species: *Plumiera rubra* L. The plants are known as ALELI, TABEIBA and FRANGIPANNI.

Leaves acute or acuminate.

Leaves elongated-lanceolate, usually tomentulose beneath.

Leaves elliptic, glabrous.

Leaves rounded, obtuse or emarginate.

Leaves oblong to oblong-obovate.

Leaves obovate or cuneate-obovate.

Leaves cuneate-obovate, long-petioled, green on both sides.

Leaves obovate, short-petioled, whitish beneath.

1. *P. alba*.

2. *P. rubra*.

3. *P. obtusa*.

4. *P. Krugii*.

5. *P. portoricensis*.

1. *Plumiera alba* L. Sp. Pl. 210. 1753.

A tree, with maximum height of about 10 m. Leaves elongated-lanceolate or linear-lanceolate, subcoriaceous, 1–2.5 dm. long, 1–3 cm. wide, glabrous above, densely whitish-tomentulose or glabrous and reticulate-veined beneath, the secondary veins nearly horizontal, acuminate or obtuse at the apex, narrowed at the base, the petioles 1–3 cm. long; peduncles stout, glabrous, as long as the leaves or shorter; inflorescence compact, several-many-flowered; pedicels short; calyx 2–3 mm. long, its lobes rounded; corolla white with a yellow eye, its tube about 2 cm. long, its obovate rounded lobes about 3 cm. long; follicles 10–12 cm. long, about 1.5 cm. thick.

Coastal thickets and hillsides, Porto Rico, at lower elevations in moist and dry districts; Muertos; Icacos; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda; Anegada:—Anguilla to Grenada; Cayman Islands. The yellowish wood, used in carpentry, is hard, tough, heavy and strong. ALELI CIMARRON. WHITE PAUCIPAN. NOSEGAY TREE.

2. *Plumiera rubra* L. Sp. Pl. 209. 1753.

A tree, 5–8 m. high, the young twigs, peduncles and pedicels pubescent. Leaves elliptic-oblong to elliptic-obovate, 1.5–4 dm. long, acute or short-acuminate at the apex, narrowed at the base, glabrous on both sides, the lateral veins rather distant and widely spreading, the petioles 3–6 cm. long; panicles several-many-flowered, mostly shorter than the leaves; pedicels stout, thickened

above, 1.5–3 cm. long; calyx about 3 mm. long; corolla purple or red, 5–7 cm. broad, the tube rather shorter than the limb, the lobes broadly elliptic, obtuse; follicles 1.5–2.5 cm. long, about 2.5 cm. in diameter.

Commonly planted for ornament in Porto Rico and the Virgin Islands, locally spontaneous after cultivation;—widely planted in the West Indies; native of continental tropical America. RED PAUCIPAN.

3. *Plumiera obtusa* L. Sp. Pl. 210. 1753.

A tree, 4–6 m. high, often flowering when not more than 1.5 m. high, the stout twigs, the leaves and the inflorescence glabrous. Leaves oblong to oblong-ob lanceolate or oblong-obovate, 7–20 cm. long, rounded or emarginate at the apex, mostly narrowed or somewhat cuneate at the base, the lateral veins nearly straight and rather widely spreading, the slender petioles 2–6 cm. long; panicles few-several-flowered; peduncle as long as the leaves or shorter; pedicels short; calyx about 3 mm. long; corolla white with a yellow eye, the lobes obovate or oblong-obovate, rounded at the apex, 1.5–2 cm. long, about as long as the tube; follicles 7–12 cm. long, about 1 cm. in diameter.

Rocky soil, Mona; St. Croix (according to West);—Bahamas; Cuba; Hispaniola.

4. *Plumiera Krugii* Urban, Symb. Ant. 1: 387. 1899.

A glabrous small tree, 4–6 m. high. Leaves obovate, 6–15 cm. long, subcoriaceous, the lateral veins ascending, the apex rounded, subtruncate or emarginate, rarely apiculate, the base cuneate, the slender petioles about 5.5 cm. long or shorter, both surfaces green; peduncles rather stout, 6–12 cm. long; inflorescence dense, several-many-flowered; pedicels short; calyx-teeth short and broad; follicles 10–15 cm. long, 1–1.5 cm. thick; seeds 3–3.5 cm. long, the thin wing about as long as the body.

Mountain slopes, especially on serpentine, western districts of Porto Rico. Endemic.

5. *Plumiera portoricensis* Urban, Symb. Ant. 1: 387. 1899.

Leaves obovate, about 7 cm. long and 3 cm. wide, whitish green beneath, the lateral veins nearly horizontal, the apex rounded, the base narrowed, the petioles only about 5 mm. long; peduncle 10–12 cm. long; corolla-tube dark violet, the lobes 3–3.5 cm. long, 6–7 mm. wide, white with a yellow base. [*P. obtusa* of Bello, not of Linnaeus.]

Described by Urban from a painting by Krug of a plant from western Porto Rico; known to us only from the description.

Plumiera Tenorii Gasp., recorded by Stahl as formerly in a garden at Mayaguez, Porto Rico, resembles *P. rubra*, but the corolla is white, with a yellow tube and throat.

3. *CATHARANTHUS* G. Don, Gen. Syst. 4: 95. 1838.

Herbs or low shrubs, with opposite leaves, and large axillary flowers, solitary or 2 together. Calyx eglandular, 5-cleft, the lobes narrow. Corolla salverform, its cylindric tube slightly enlarged above, its 5 broad lobes sinistrorse. Stamens included; anthers not appendaged. Disk of 2 large glands. Carpels 2, distinct; style very slender; stigma thick, pilose; ovules many in each carpel. Follicles narrowly cylindric, many-seeded. Seeds small, unappendaged. [Greek, pure flower.] Three known species, the following typical one native of tropical America, widely distributed through cultivation, one East Indian, the other of Madagascar.

1. **Catharanthus roseus** (L.) Don, Gen. Syst. 4: 95. 1838.

Vinca rosea L. Syst. ed. 10. 944. 1759.

Lochnera rosea Rchb. Consp. 134. 1828.

Ammocallis rosea Small, Fl. SE. U. S. 936. 1903.

Somewhat woody, usually branched, pubescent, 8 dm. high or less. Leaves oblong to oblong-oblongeolate, 3–8 cm. long, obtuse or retuse at the apex, mucronulate, narrowed at the base into short petioles; peduncles very short, pubescent; calyx-lobes linear-subulate, 3–4 mm. long, pubescent; corolla white or pink, the finely pubescent tube 2.5–3 cm. long, the oblique lobes somewhat shorter than the tube; follicles cylindric, pubescent, 2–3 cm. long.

Coastal sands, waste grounds and roadsides, Porto Rico, escaped from cultivation and locally naturalized; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Florida; West Indies; continental tropical America and Old World tropics. Widely planted for ornament. FLOR DE TODO EL AÑO. PERIWINKLE. CHURCH-FLOWER.

4. **TABERNAEMONTANA** L. Sp. Pl. 210. 1753.

Mostly glabrous trees or shrubs, with opposite pinnately veined leaves and rather large cymose flowers. Calyx short, 5-lobed, glanduliferous at the base within, the lobes obtuse, imbricated. Corolla salverform, the tube nearly cylindric, the 5 lobes sinistrorsely contorted. Stamens borne on the corolla-tube; anthers sagittate, their sacs unappendaged. Carpels 2; ovules numerous; style short or slender; stigma with an annular membrane at the base. Fruiting carpels short, coriaceous or fleshy, indehiscent. [Commemorates J. T. Tabernaemontanus, German botanist, died 1590.] Perhaps 150 species, of tropical distribution. Type species: *Tabernaemontana citrifolia* L.

1. **Tabernaemontana oppositifolia** (Spreng.) Urban, Symb. Ant. 4: 493 1910.

Rauwolfia oppositifolia Spreng. Neue Entd. 3: 33. 1822.

Anabata odorata Spreng. Syst. 1: 582. 1825.

Tabernaemontana Berterii DC. Prodr. 8: 367. 1844.

A tree up to 12 m. high, or shrubby, glabrous throughout. Leaves elliptic or oblong to obovate-elliptic, chartaceous, shining, 6–18 cm. long, acute or abruptly acuminate at the apex, narrowed or cuneate at the base, the unequal petioles about 2 cm. long or shorter; cymes few-several-flowered, loose; pedicels slender, 5–20 mm. long; calyx about 5 mm. long, its lobes ovate; corolla white, its tube 10–13 mm. long, its oblong-obovate lobes about as long. [*T. citrifolia* of Bello and of Stahl, not of Jacquin.]

Woods and forests in wet or moist districts, Porto Rico. Endemic. PALO DE LECHOSO. PEGOGÉ.

Tabernaemontana coronaria (Jacq.) Willd., CRAPE JASMINE, of unknown origin, planted for ornament in Porto Rico and the Virgin Islands, is a glabrous shrub, with bright green, opposite, elliptic to oblong-lanceolate, acuminate leaves 7–15 cm. long, and cymose, white, usually double flowers about 3 cm. broad. [*Nerium coronarium* Jacq.; (?) *Tabernaemontana macrophylla* of Krebs.]

Tabernaemontana nereifolia Vahl, recorded by Vahl as found in Porto Rico by von Rohr, and otherwise unknown (Vahl, Eclog. 2: 21. 1798), is a lost species, no known specimen being extant. From the description it would appear that the plant may not be of this genus.

A species of *Tabernaemontana* was found in thickets at Frenchman's Bay, St. Thomas, prior to 1876, according to Eggers, who doubtfully recorded it as *T. citrifolia* L.; search for it there in 1913 was fruitless.

5. **ANECHITES** Griseb. Fl. Br. W. I. 410. 1861.

A slender scabrous twining vine, with opposite petioled leaves, the rather small white flowers in loose long-peduncled racemiform clusters opposite the leaves. Calyx small, 5-cleft, glanduliferous at the base within. Corolla salverform, the tube subcylindric, contracted at the throat, the 5 lobes sinistrorse. Stamens borne at about the middle of the corolla-tube; anthers oblong, their sacs unappendaged. Carpels 2, distinct. Style filiform; stigma annulate at base; ovules few or several. Follicles linear, stipitate, terete, densely pubescent with stiff partly reflexed hairs above. [Greek, not *Echites*.] A monotypic genus.

1. **Anechites Nerium** (Aubl.) Urban, Repert. 16: 150. 1919.

Apocynum Nerium Aubl. Pl. Guian. 1: 277; 2: Table des Noms 3. 1775.

Echites lappulacea Lam. Encycl. 2: 341. 1786.

Echites asperuginis Sw. Prodr. 52. 1788.

Anechites asperuginis Griseb. Fl. Br. W. I. 410. 1861.

Anechites lappulacea Miers. Apoc. S. A. 237. 1878.

Stem up to 10 m. long, sparingly pubescent with short stiff hairs. Leaves oblong-ovate, 5–10 cm. long, membranous, pinnately veined, scabrous, with scattered short, thick-based hairs above, sparingly pubescent on the midvein beneath, the apex acute or acuminate, the base rounded or cordate, the slender petioles 1–2 cm. long; peduncles slender, elongated, 1–1.5 dm. long; flowers few or several; pedicels nearly filiform, 8–15 mm. long, calyx 2–3 mm. long; corolla-tube about 6 mm. long, the limb 12–15 mm. broad; follicles 6–8 cm. long, sparingly pubescent below, hispid above.

Collected by Stahl near Vega Baja, Porto Rico:—Jamaica; Cuba; Hispaniola; Colombia; Ecuador.

6. **RAUWOLFIA** L. Sp. Pl. 208. 1753.

Shrubs or trees with whorled or opposite leaves and small flowers in peduncled cymes. Calyx eglandular, 5-cleft or 5-parted. Corolla salverform, the tube subcylindric, the 5 lobes sinistrorse. Stamens included; anthers obtuse, their sacs not appendaged. Disc annular or cup-shaped. Carpels 2, distinct or connate; style filiform; stigma thick, annular or with a reflexed membrane at the base; ovules 2 in each carpel. Fruit of 2 drupes, usually connate, the fruit thus usually emarginate and 2-grooved. Seeds ovoid with fleshy endosperm. [Commemorates Leonh. Rauwolf, a German botanist.] Forty species or more, natives of tropical regions and of South America. Type species: *Rauwolfia tetraphylla* L.

Fruit 8–12 mm. broad; leaves shining.

Fruit 5–7 mm. broad; leaves dull.

1. *R. tetraphylla*.

2. *R. Lamarckii*.

1. **Rauwolfia tetraphylla** L. Sp. Pl. 208. 1753.

Rauwolfia nitida Jacq. Enum. 14. 1760.

Rauwolfia lanceolata A. DC. Prodr. 8: 337. 1844.

A glabrous tree, up to 20 m. high, or shrubby, the twigs slender. Leaves oblong-lanceolate or elliptic-lanceolate, subcoriaceous, verticillate in 4's or some of them opposite, acuminate or acute at the apex, tapering at the base, shining above, rather dull beneath, the lateral veins numerous, widely spreading, the

petioles 6–12 mm. long; peduncles shorter than the leaves; cymes many-flowered; pedicels very short; calyx 2 mm. long, its lobes ovate; corolla white, its tube 2–3 times as long as the calyx, its lobes about one-half as long as the tube; fruit 1–1.5 cm. broad, 8–12 mm. high, red, its lobes ovoid, rounded.

Thickets, hillsides and woodlands at lower and middle elevations, Porto Rico; Mona; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Bahamas; Jamaica; Cuba; Hispaniola; recorded from St. Barts. CACHINHO. PALO AMARGO. MILK BUSH.

2. *Rauwolfia Lamarckii* A. DC. Prodr. 8: 337. 1844.

A branching shrub, 1–3 m. high, the twigs and leaves glabrous, the inflorescence glabrous or sparingly pubescent. Leaves oblong to elliptic, 4–10 cm. long, pinnately veined, verticillate in 3's or 4's, membranous, dull, the apex acute or acuminate, the base narrowed, the petioles 4–7 mm. long; peduncles shorter than the leaves; cymes several-many-flowered; pedicels short; calyx about 1.5 mm. long, its lobes ovate to lanceolate, acute; corolla white, its tube about 2 mm. long, its lobes nearly as long; fruit 5–7 mm. broad, nearly black.

Coastal thickets, eastern districts of Porto Rico; Icacos; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Virgin Gorda:—Cuba (?); Hispaniola; St. Martin to Tobago; Margarita; Venezuela. BITTER BUSH.

A specimen of *Rauwolfia canescens* L., preserved in the Torrey Herbarium, is annotated as collected in St. Thomas by Perrin, without date, but doubtless many years ago; as the species is not otherwise known from Porto Rico or the Virgin Islands, the record is believed to be erroneous. It differs from *R. Lamarckii* by densely tomentulose leaves and obtuse calyx-lobes.

7. *CERBERA* L. Sp. Pl. 208. 1753.

Glabrous trees or shrubs, with alternate, 1-nerved and pinnately veined leaves, and large yellow flowers in terminal peduncled cymes. Calyx 5-parted, many-glandular within at the base. Corolla funnelform, the tube cylindric below, bearing pilose scales at the top within, abruptly expanded into a campanulate throat, the 5 broad rounded lobes sinistrorse. Stamens borne with the scales at the top of the tube; anther-sacs unappendaged. Disk wanting. Ovary 2-lobed, 2-celled; style filiform; stigma discoid, its small tip 2-lobed; ovules 2 in each cavity of the ovary. Fruit a compressed drupe, broader than high, the flesh thin, the bony endocarp 2-celled. Seeds with a thick testa and no endosperm. [Named for Cerberus, the three-headed dog of mythology.] About 7 species, natives of tropical America. Type species: *Cerbera Ahouai* L.

1. *Cerbera Thevetia* L. Sp. Pl. 209. 1753.

Thevetia nereifolia Juss.; Steud. Nom. ed. 2, 2: 680. 1841.

Thevetia Thevetia Millsp. Field. Mus. Bot. 2: 83. 1900.

A shrub, or small tree up to about 10 m. high, glabrous throughout, the twigs rather stout, densely leafy. Leaves linear, 7–15 cm. long, 5–10 mm. wide, narrowed at both ends, very nearly sessile, bright green and shining above, rather dull beneath, the midvein prominent, the lateral venation obscure; calyx-segments about 7 mm. long, ovate-lanceolate, acuminate; corolla yellow, about 7 cm. long, funnelform with the tube shorter than the limb; drupe triangular-compressed, 3–4 cm. broad, about 2 cm. high, and 1–1.5 cm. thick, nearly truncate, the flesh thin.

Coastal thickets, Porto Rico, and commonly planted for ornament and interest; St. Croix; St. Thomas; St. Jan:—Florida; West Indies; continental tropical America. MILK TREE. CABALONGA. LUCKY-NUT.

8. **ECHITES** Jacq. Enum. 2, 13. 1760.

Twining, somewhat woody vines, with opposite petioled leaves, and rather large flowers in cymes. Calyx 5-lobed, glandular. Corolla salverform, the cylindric tube somewhat swollen, the lobes spreading. Stamens included, the anthers appendaged at the base. Fruit of 2 follicles, many-seeded. [Greek, an adder, referring to the twining stem.] About 40 species, of tropical and sub-tropical America. Type species: *Tabernaemontana Echites* L.

1. **Echites agglutinata** Jacq. Enum. 13. 1760.

Echites circinalis Sw. Prodr. 52. 1788.

Echites obtusifolia Sessé & Moc. Fl. Mex. ed. 2, 42. 1894.

A glabrous vine, up to 7 m. long or longer. Leaves ovate to elliptic or ovate-orbicular, chartaceous, 4–10 cm. long, pinnately veined, the apex short-acuminate or mucronate, the base rounded, obtuse or narrowed, the petioles 2 cm. long or shorter; peduncles shorter than or as long as the leaves; cymes racemiform, few-flowered; pedicels short, stout; calyx-lobes ovate, acute; corolla greenish, its tube about 6 mm. long, its lobes nearly as long; follicles linear, 10–17 cm. long. [*E. umbellata* of Bello and of Stahl, not of Jacquin.]

Thickets at lower and middle elevations, Porto Rico, most abundant in dry districts; Mona; St. Croix; St. Thomas; St. Jan; Tortola:—Hispaniola. BABEIRO.

Echites Echites (L.) Britton was erroneously recorded from Porto Rico by Grisebach, by Bello and by Stahl, and this error was carried into the "Bahama Flora." [*Tabernaemontana Echites* L.; *Echites umbellata* Jacq.]

Echites nitida Vahl, recorded by Krebs from St. Thomas, is a South American species.

Echites thomasiana DC. is unpublished, appearing in Krebs' list of plants found in St. Thomas, and not identified.

9. **RHABDADENIA** Muell. Arg. in Mart. Fl. Bras. 6¹: 173. 1860.

Woody vines, rarely erect shrubs, with opposite petioled leaves, and large flowers in small racemes, or solitary. Calyx 5-cleft. Corolla tubular-campanulate, with a cylindric base and a spreading 5-lobed limb, the lobes broad, dextrorse. Stamens short, included, borne near the top of the corolla-tube; anthers oblong, connivent around the stigma, the sacs with short obtuse appendages at the base. Carpels 2, distinct; style slender; stigma thick, its base dilated into a reflexed membrane; ovules many in each carpel. Follicles linear, parallel or little divergent, many-seeded. Seeds linear, comose. [Greek, wand-gland; probably referring to the fruit.] About 10 species, of Florida, the West Indies and South America. Type species: *Rhabdadenia Pohlii* Muell. Arg.

1. **Rhabdadenia biflora** (Jacq.) Muell. Arg. in Mart. Fl. Bras. 6¹: 175. 1860.

Echites biflora Jacq. Enum. 13. 1760.

A glabrous vine, 3–8 m. long, the branches slender, terete. Leaves oblong to elliptic, oblanceolate or obovate, somewhat fleshy, 5–10 cm. long, faintly pinnately veined, the apex acute or obtuse, apiculate, sometimes emarginate, the base narrowed, the petioles about 2 cm. long or shorter; peduncles as long as the

leaves or shorter, 1-few-flowered; calyx short, its ovate lobes acute; corolla white, 5-6 cm. long, the cylindric part about 2 cm. long; follicles 10-12 cm. long.

Mangrove swamps, Porto Rico; St. Thomas (ex Krebs):—Guadeloupe to Trinidad and northern South America. MANGROVE VINE.

10. **URECHITES** Muell. Arg. *Linnaea* 30: 440. 1860.

Somewhat woody, twining vines, with opposite petioled leaves, and large mostly yellow, cymose flowers. Calyx-lobes 5, narrow; calyx-tube glandular within. Corolla cylindric below, expanded into a narrowly campanulate throat, the limb 5-lobed, somewhat spreading. Anthers appendaged at the base, partly adherent to the stigma. Fruit of 2 long linear follicles. Seeds narrow, comose. [Greek, tailed-*Echites*.] A few species, of tropical America. Type species: *Urechites Karwinskii* Muell. Arg.

1. **Urechites lutea** (L.) Britton, *Bull. N. Y. Bot. Gard.* 5: 316. 1907.

Vinca lutea L. *Cent. Pl.* 2, 12. 1756.

Echites suberecta Jacq. *Enum.* 13. 1760.

Echites barbata Desv. in *Ham. Prodr.* 30. 1825.

Echites Catesbaei G. Don. *Syst.* 4: 74. 1838.

Echites Andrewsii Chapm. *Fl. S. U. S.* 359. 1860.

Echites neriandra Griseb. *Fl. Br. W. I.* 415. 1861.

Urechites Andrewsii Small, *Fl. SE. U. S.* 936. 1903.

Pubescent or glabrous, slender, often 3 m. long or more. Leaves oblong to obovate or suborbicular, herbaceous, 2-8 cm. long dark green above, pale green beneath, mostly obtuse at the apex and narrowed at the base, the slender petioles about 1 cm. long; cymes few-several-flowered; pedicels slender; calyx-lobes narrowly lanceolate, acuminate, 8-12 mm. long; corolla yellow, 3-4 cm. long; anthers mostly tipped by filiform appendages; follicles linear, 10-15 cm. long, 4-5 mm. thick.

Thickets, along and near the coasts, Porto Rico; Mona; Icacos; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Anegada:—Florida; West Indies, south to St. Kitts, and recorded from St. Vincent. BABIERO AMARILLO.

11. **FORSTERONIA** G. F. W. Meyer, *Prin. Fl. Esseq.* 133. 1818.

Woody vines, with opposite, pinnately veined leaves and small flowers in terminal corymbose or paniced cymes. Calyx 5-parted. Corolla salverform, or subcampanulate, the tube short, the limb 5-lobed. Stamens borne on the corolla-tube, with short filaments, the oblong-sagittate anthers with appendaged sacs. Carpels 2, distinct; style short; stigma ovoid. Follicles elongated, subterete, slender. Seeds linear, with an apical coma. [Commemorates Forly Forster.] Thirty species or more, natives of tropical America, the following typical.

1. **Forsteronia corymbosa** (Jacq.) G. F. W. Meyer, *Prim. Fl. Ess.* 134. 1818.

Echites corymbosa Jacq. *Enum.* 13. 1760.

High-climbing, up to 7 m. long or longer, the branches terete, the foliage glabrous. Leaves oval or elliptic, coriaceous, 4-8 cm. long, rather dark green, shining above, the apex acute or obtuse, the base obtuse or rounded, the petioles 8 mm. long or less; cymes corymbose, many-flowered, puberulent or glabrous, 4-8 cm. broad; pedicels short, rather stout; calyx-lobes oblong, obtuse, 1.5-2 mm. long; corolla red or purple, about 6 mm. long, the oblong lobes longer than the

tube; anthers yellow, somewhat exserted; follicles straight, about 8 cm. long. [*F. floribunda* of Cook and Collins.]

Woods, thickets and forests, Porto Rico, in wet or moist districts, ascending to higher elevations:—Cuba; Hispaniola; recorded from Guiana. BEJUCO DE SAN JUAN. LECHE DE PERRA. SANJUANERA.

Arduina grandiflora E. Meyer, NATAL PLUM, South African, occasionally grown in Porto Rico and the Virgin Islands for its edible fruit, is a glabrous shrub, about 2 m. high, with forked spines 2–5 cm. long, ovate thick glabrous, short-petioled leaves 2–7 cm. long, the white flowers solitary or in terminal cymes, the corolla-lobes dextrorsely contorted, the ovoid pointed red berry 2.5–5 cm. long. [*Carissa grandiflora* A. DC.]

Arduina Carandas (L.) Britton, East Indian, was experimentally planted at the Insular Agricultural Experiment Station, Rio Piedras, in 1923. [*Carissa Carandas* L.]

Strophanthus gratus (Wall. & Hook.) Baill., native of western tropical Africa, seen as a tree about 4 m. high in gardens at St. Thomas in 1923, has glabrous oblong, short-petioled, coriaceous leaves 6–10 cm. long with few divergent lateral veins, the showy flowers terminal, the campanulate calyx about 12 mm. long, the corolla with a crimson campanulate tube about 3 cm. long and a spreading light-purple limb about 6 cm. broad. [*Roupellia grata* Wall. & Hook.]

Nerium Oleander L., ADELFA, LAUREL ROSADO, OLEANDER, Oriental, commonly planted for ornament in Porto Rico and the Virgin Islands, is a shrub, 2–5 m. high with narrowly oblong leaves 7–13 cm. long, opposite or whorled in 3's, glabrous, the apex acuminate or acute; the pink or white often double flowers are in terminal cymes, the corolla 3–5 cm. broad; the follicles are linear, straight, 10–17 cm. long. It has been reported as spontaneous in Porto Rico, but we have not observed it except where planted.

Family 6. ASCLEPIADACEAE Lindl.

MILKWEED FAMILY.

Perennial herbs, vines or shrubs, mostly with milky juice, with estipulate leaves, and cymose or umbellate, perfect regular flowers. Calyx inferior, its tube very short, or none, its segments imbricated or separate in the bud. Corolla campanulate, urceolate, rotate or funnelform, 5-lobed or 5-cleft, the segments commonly reflexed. A 5-lobed or 5-parted crown (corona) between the corolla and the stamens and adnate to one or the other. Stamens 5, inserted on the corolla; filaments short, stout, mostly monadelphous, or distinct; anthers attached by their bases to the filaments, introrsely 2-celled, connivent around the stigma, or more or less united with each other; anther-sacs tipped with an inflexed or erect scarious membrane, or unappendaged at the top, sometimes appendaged at the base; pollen coherent into waxy or granular masses, one or rarely two such masses in each sac, connected with the stigma in pairs or fours, by 5 glandular corpuscles alternate with the anthers. Disk none. Ovary of 2 carpels; styles 2, short, connected at the summit by the peltate discoid stigma; ovules numerous in each carpel, mostly anatropous, pendulous. Fruit of 2 follicles. Seeds compressed, usually appendaged by a long coma; endosperm cartilaginous; embryo nearly as long as the seed; cotyledons flat. About 220 genera and 2,000 species, of wide distribution.

- A. Erect herbs, sometimes a little woody.
Corolla-lobes reflexed; crown-segments with a horn-like process within.
- B. Twining vines.
- 1. Stigmas not bifid.
- a. Crown single.
Stigma without a central appendage.
Pollinia pendulous; slender vines.
- 2. Stigmas deeply bifid; crown 5-scaled.
- 3. *Metastelma*.
- 4. *Marsdenia*.
- 5. *Hoya*.
- 6. *Ibatia*.
- 7. *Funastrum*.
- 8. *Vincetoxicum*.
- 9. *Oxypetalum*.

1. **ASCLEPIAS** L. Sp. Pl. 214. 1753.

Perennial herbs, with entire leaves, and middle-sized or small flowers in umbels. Calyx 5-parted or 5-divided, usually small, segments or sepals acute, often glandular within. Corolla deeply 5-parted, the segments mostly valvate, reflexed in anthesis. Corona-column generally present. Corona of 5 concave hoods, each bearing within a slender or subulate incurved horn. Filaments connate into a tube; anthers tipped with an inflexed membrane, winged, the wings broadened below; pollen-masses (pollinia) solitary in each sac, pendulous on their caudicles. Stigma nearly flat, 5-angled or 5-lobed. Follicles acuminate. Seeds comose in all but one species. [Dedicated to Aesculapius.] About 95 species, mostly natives of the New World. Type species: *Asclepias syriaca* L.

Corolla red or yellow.
Corolla white.

- 1. *A. curassavica*.
- 2. *A. nivea*.

1. **Asclepias curassavica** L. Sp. Pl. 215. 1753.

Asclepias nivea curassavica Kuntze, Rev. Gen. Pl. 418. 1891.

Asclepias nivea flava Kuntze, Rev. Gen. Pl. 418. 1891.

Asclepias curassavica concolor Krug & Urban; Urban, Symb. Ant. 1: 389. 1899.

Glabrous, or finely pubescent above, 8 dm. high or less, herbaceous or somewhat woody. Leaves opposite, oblong to oblong-lanceolate, thin, 5–12 cm. long, acute or acuminate, the petioles 5–15 mm. long; umbels usually several, few-several-flowered; pedicels 1–2 cm. long; corolla-lobes red-purple, rarely yellow, 6–8 mm. long, ovate to oblong; column distinct; hoods erect, ovate, about 4 mm. high, obtuse, flattened, shorter than the flat, curved horn; fruiting pedicels erect; follicles fusiform, glabrous or minutely pubescent, 3–10 cm. long; seeds 6 mm. long, the coma 3–4 mm. long.

Banks, thickets, fields and waste grounds, Porto Rico, at lower and middle elevations; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—southeastern United States; Bermuda; West Indies; continental tropical America. ALGODONCILLO. RED MILKWEED. WILD OR BASTARD IPECAC. BLOODFLOWER.

2. **Asclepias nivea** L. Sp. Pl. 215. 1753.

Closely resembling the preceding species in height, habit, foliage, in inflorescence and fruit, the leaves sometimes broader, lanceolate to ovate. Corolla-lobes white.

Banks, fields and waste grounds, Porto Rico, at lower and middle elevations, often seen in proximity to *A. curassavica* and a form intermediate between the two has been recorded; St. Thomas:—Jamaica; Cuba; Hispaniola; St. Martin; Saba; Martinique.

2. **CALOTROPIS** R. Br. in Ait. f. Hort. Kew. ed. 2, 2: 78. 1811.

Shrubs or trees, with broad, nearly sessile, opposite leaves, and rather large flowers in terminal or axillary umbel-like cymes. Calyx 5-parted, bearing several-many glands at the base within. Corolla subrotate, 5-cleft, with broad lobes; corona-scales 5, fleshy, adnate to the stamen-tube, lobed or toothed, short-spurred. Stamens borne at the base of the corolla; filaments connate, forming a short tube; anthers tipped by an inflexed membrane; pollinia solitary in each sac, pendulous. Follicles thick, pointed. Seeds comose. [Greek, beautiful keel.] Three species, natives of the Old World tropics, the following typical.

1. **Calotropis procera** (Ait.) R. Br. in Ait. f. Hort. Kew. ed. 2, 2: 78. 1811.

Asclepias procera Ait. Hort. Kew. 1: 305. 1789.

Arboreous, 1–5 m. high, branched, with the aspect of a gigantic herb. Leaves obovate-oblong to broadly elliptic or nearly orbicular, mostly cuspidate at the apex, cordate at the base, white-felted when young, glabrous when old; the stout petiole 1 cm. long or less; cymes 5–8 cm. broad, several-many-flowered, on stout peduncles 4–8 cm. long; pedicels 1–3 cm. long; calyx-segments ovate, about 4 mm. long; corolla white, tinged with violet, 2–2.5 cm. broad; follicles swollen, 3–8 cm. long. [*Calotropis gigantea* of Krebs.]

Fields, hillsides and waste grounds, Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan.—West Indies; continental tropical America. Native of the Old World tropics. Sometimes grown for ornament in the Virgin Islands. ALGODON DE SEDA. GIANT MILKWEED. MUDAR.

Calotropis aspera R. Br., a name listed by Krebs for a plant found in St. Thomas, can not be traced, as there is no such published species.

3. **METASTELMA** R. Br. Mem. Wern. Soc. 1: 52. 1809.

Slender perennial vines, with small opposite leaves, and small or minute white or greenish flowers in axillary cymes. Calyx-lobes 5, usually with a gland in each sinus. Corolla subrotate or campanulate, rather deeply 5-lobed. Corona simple, 5-parted, its segments narrow. Pollinia waxy. Gynostegium sessile or stipitate. Stigma flat. Follicles small, slender, smooth. [Greek, referring to the parted corona.] Fifty species or more, natives of tropical and subtropical America. Type species: *Cynanchum parviflorum* Sw.

Plants nearly or quite leafless at flowering time.

Plants leaf-bearing at flowering time.

Leaves linear to linear-oblong or oblong-oblancheolate.

Corolla-lobes ovate-lanceolate.

Corolla-lobes oblong-lanceolate.

Leaves narrowly linear.

Leaves oblong to oblancheolate, apiculate.

Leaves ovate to ovate-lanceolate.

Gynostegium long-stipitate.

Gynostegium sessile or short-stipitate.

Corona-lobes rhombic-dilated above.

Corona-lobes linear.

1. *M. ephedroides*.

2. *M. monense*.

3. *M. lineare*.

4. *M. anegadense*.

5. *M. parviflorum*.

6. *M. decipiens*.

7. *M. Decaisneanum*.

1. **Metastelma ephedroides** (Griseb.) Schlechter in Urban, Symb. Ant. 1: 262. 1899.

Amphistelma ephedroides Griseb. Cat. Pl. Cub. 174. 1866.

Glabrous, essentially leafless at flowering time or bearing a few scattered linear leaves 1–1.5 cm. long, the leaves mostly reduced to minute scales. Flowers few, in distant cymes; pedicels filiform, puberulent, about 3 mm. long; calyx-

lobes oblong, obtuse; corolla-lobes oblong, obtuse, about 3 times as long as the calyx, puberulent or glabrous; corona-lobes obtuse; gynostegium sessile; follicles 4–6 cm. long. [Includes *Metastelma filiforme* of Schlechter, not of C. Wright.]

Forests of the central and western mountains of Porto Rico:—Cuba; Hispaniola.

2. *Metastelma monense* Britton, sp. nov.

Glabrous; leaves linear, involute, acute, short-petioled, 8–17 mm. long. Cymes few-flowered, sessile; pedicels rather stout, 1–1.5 mm. long; calyx-lobes ovate, glabrous, acutish or obtuse, about 1 mm. long; corolla-lobes ovate-lanceolate, about 2 mm. long, glabrous without, pubescent within; corona-lobes oblong-lanceolate, about as long as the corolla; gynostegium sessile.

Limestone rocks, Mona. Type from the limestone plateau at Sardinera (Britton, Cowell and Hess 1713). Endemic.

3. *Metastelma lineare* Bello, Anales Soc. Esp. Hist. Nat. 10: 292. 1881.

Glabrous, leafy; leaves linear, acute, 2–4 cm. long. Cymes umbel-like, sessile or nearly so, few-several-flowered; pedicels slender, 1.5–2.5 mm. long; calyx-lobes ovate, obtuse or acutish, about 1 mm. long; corolla-lobes oblong-lanceolate, obtuse, pubescent within, about 3 mm. long; corona-lobes linear-filiform, erect; gynostegium nearly sessile; follicles about 4 cm. long.

Thickets and mountain slopes, western districts of Porto Rico. Recorded by Urban from Cuba.

4. *Metastelma anegadense* Britton, sp. nov.

Glabrous, about 3 dm. long. Leaves linear-oblong to narrowly oblanceolate, 1.5–3.5 cm. long, 3–8 mm. wide, the apex abruptly acute, the base narrowed, the petioles 2 mm. long or shorter. Cymes sessile, few-several-flowered; pedicels 2–2.5 mm. long; calyx very small, its ovate acute lobes 1 mm. long; corolla greenish yellow, its narrowly lanceolate acute lobes 3 mm. long, glabrous without, puberulent within, ciliate; gynostegium sessile.

Sandy plain, West End, Anegada (Britton and Fishlock 962). Endemic. Recorded (Mem. N. Y. Bot. Gard. 6: 568, 577) as *Astephanus*.

5. *Metastelma parviflorum* R. Br. Mem. Wern. Soc. 1: 52. 1809.

Metastelma Paralias Dene. in DC. Prodr. 8: 514. 1844.

Glabrous or nearly so, up to 4 m. long or longer. Leaves ovate to oblong-lanceolate, 2–4 cm. long, the apex acute, the base rounded, the slender petioles 4–10 mm. long; cymes sessile or very short-peduncled; few-flowered; pedicels 2–3 mm. long; calyx-lobes ovate, obtuse, ciliate, nearly 1 mm. long; corolla-segments oblong-lanceolate, obtuse, about 2 mm. long, glabrous without, white-puberulent along the margins within; corona-lobes linear-spatulate, dilated above, erect; gynostegium long-stipitate; follicles 4–5 cm. long. [*M. Schlechtendalii* of Eggers and of Millspaugh, not of Decaisne.]

Thickets at lower elevations, Porto Rico; St. Croix; St. Thomas; Tortola; Virgin Gorda:—St. Martin; St. Barts; Antigua; Guadeloupe; Martinique; Dominica; Trinidad; Margarita. Apparently distinct from the following species by its long-stipitate gynostegium, otherwise similar.

6. *Metastelma decipiens* Schlechter in Urban, Symb. Ant. 1: 249. 1899.

Metastelma fallax Schlechter in Urban, Symb. Ant. 1: 249. 1899.

Glabrous; leaves ovate to ovate-oblong, 1.5–3 cm. long, the apex acute, the base rounded, the petioles 2–6 mm. long. Cymes few-flowered, sessile or short-

peduncled; pedicels 2–3 mm. long; calyx-lobes ovate, obtuse; corolla-lobes oblong or oblong-lanceolate, puberulent along the margins within, about 2 mm. long, 2–3 times as long as the calyx; corona-lobes linear-spatulate, erect; gynostegium sessile or nearly so. [*Gonolobus pubescens* of Stahl, not of Grisebach; *Vince-toxicum pubescens* of Cook and Collins.]

Thickets at lower and middle elevations, Porto Rico; Icacos (?); St. Thomas:—Tobago.

7. **Metastelma Decaisneanum** Schlechter in Urban, Symb. Ant. 1: 250. 1899.

Metastelma Grisebachianum Schlechter in Urban, Symb. Ant. 5: 469. 1908.

Glabrous or very nearly so, or the young shoots puberulent. Leaves ovate to oblong-ovate, the apex acute or apiculate, the base rounded, the petioles 2–5 mm. long; cymes sessile or very short-peduncled, few-several-flowered; pedicels 2–5 mm. long; calyx-lobes ovate, obtuse, puberulent or ciliolate, less than 1 mm. long; corolla-lobes ovate-oblong, obtuse, nearly 2 mm. long, glabrous or puberulent within; corona-lobes linear; gynostegium sessile. [*M. parviflorum* of Decaisne, not of R. Brown; *M. albiflorum* of Schlechter, not of Grisebach.]

Thickets at lower elevations, Porto Rico; St. Croix; St. Thomas:—Guadeloupe; Martinique; St. Vincent. Perhaps not distinct from the preceding species.

4. **MARSDENIA** R. Br. Mem. Wern. Soc. 1: 28. 1809.

Twining vines, or shrubs, the leaves opposite, the rather small flowers in terminal or axillary umbel-like cymes. Calyx 5-parted. Corolla mostly campanulate, 5-lobed or 5-cleft, the lobes obtuse. Corona-scales 5, erect, flat. Stamens borne near the base of the corolla; filaments connate; pollinia oblong or ovoid, erect. Stigma flat, convex or rostrate. Follicles smooth, sometimes winged. Seeds comose. [Commemorates William Marsden, English traveller.] About 70 species, natives of tropical regions. Type species: *Marsdenia tinctoria* R. Br.

1. **Marsdenia elliptica** Dcne. in DC. Prodr. 8: 616. 1844.

Twining. Leaves elliptic to oblong-elliptic, thick, acuminate, the margins reflexed; peduncles shorter than the petioles; cymes dense; corolla glabrous, its lobes erect; corona-scales dilated below, attenuate above; stigma apiculate.

Forests, Sierra de Luquillo, collected only by Wydler and by Sintenis. Endemic. Erroneously recorded by Schlechter from Cuba.

5. **HOYA** R. Br. Mem. Wern. Soc. 1: 26. 1809.

Vines, sometimes climbing by aerial roots, the leaves broad, opposite, the rather large flowers in axillary umbel-like cymes. Calyx 5-parted, 5-glandular at the base within, the segments ovate or lanceolate. Corolla fleshy, rotate, deeply 5-cleft, the lobes valvate. Corona-scales 5, spreading. Stamens borne at the base of the corolla, the filaments connate; anthers connivent over the stigma; pollinia oblong, erect. Stigma flat or apiculate. Follicles smooth. [Commemorates Thomas Hoy, English horticulturist.] Sixty species or more, natives of the Old World tropics, the following typical.

1. **Hoya carnosa** (L. f.) R. Br. Mem. Wern. Soc. 1: 27. 1809.

Asclepias carnosa L. f. Suppl. 170. 1781.

A very fleshy glabrous or puberulent vine, up to 3 m. long or longer. Leaves ovate to oblong-elliptic, 6–13 cm. long, the apex acute, the base narrowed, the

petioles 1–2 cm. long; cymes usually many-flowered, short-peduncled; pedicels slender, 2–3 cm. long; flowers white, waxy, fragrant, about 15 mm. broad.

Naturalized in thickets, Louisenhøj and Mafolie, St. Thomas:—native of tropical Asia. Widely planted for ornament in tropical America. FLOR DE CERA. WAX-PLANT.

6. **IBATIA** Dcne. in DC. Prodr. 8: 599. 1844.

Twining woody vines, with cordate leaves, and small purplish or white flowers in subaxillary sessile cymes. Calyx 5-parted, the segments ovate or lanceolate. Corolla rotate, 5-parted. Corona simple, denticulate. Gynostegium short, sessile, anthers obliquely dehiscent; pollinia pendulous. Stigma pentagonal, with a central filiform appendage. Follicles ovoid, tuberculate. [West Indian name.] A few species, of tropical America, the following typical.

1. **Ibatia maritima** (Jacq.) Dcne. in DC. Prodr. 8: 599. 1844.

Asclepias maritima Jacq. Enum. 17. 1760.

Cynanchum maritimum Jacq. Sel. Amer. 83. 1763.

Ibatia muricata Griseb. Fl. Br. W. I. 421. 1861.

Tomentose, 2–6 m. long, often high-climbing. Leaves broadly ovate, acuminate, deeply cordate, membranous, slender-petioled, 10 cm. long or less; cymes few-several-flowered; pedicels short; calyx-segments ovate-lanceolate, obtuse, about 2 mm. long, villous; corolla-segments ovate-oblong, obtuse, about 4 mm. long; corona 15-denticulate; follicles 4–7 cm. long, villous-pubescent and tuberculate with short blunt stipitate processes.

Woods and thickets along and near the dry southern coast of Porto Rico; Desecheo; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Cuba (?); Hispaniola; St. Martin to Trinidad; Curaçao and northern South America. Illustrated by Cook & Collins (pl. 60) as *Vincetoxicum* sp. POPON. BEACH MILK-VINE.

7. **FUNASTRUM** Fourn. Ann. Sci. Nat. VI. 14: 388. 1882.

[PHILIBERTELLA Vail, Bull. Torr. Club 24: 305. 1897.]

Twining vines, with opposite leaves and cymose axillary flowers, their buds 5-angled. Calyx small, 5-parted. Corolla subrotate or widely campanulate, 5-lobed. Corona double, the exterior one annular, adnate to the base of the corolla, the interior one of 5 scales. Stamens borne on the base of the corolla, the filaments united into a short tube, the anthers with a terminal inflexed membrane. Pollinia solitary in each cell, oblong, waxy. Follicles elongated, smooth. [Latin, a starry cord.] About 30 species, of tropical and subtropical America. Type species: *Asclepias angustissima* Anders.

1. **Funastrum clausum** (Jacq.) Schlechter, Repert. 13: 283. 1914.

Asclepias clausa Jacq. Enum. 17. 1760.

Asclepias viminalis Sw. Prodr. 53. 1788.

Sarcostemma Swartzianum R. & S. Syst. 6: 115. 1820.

Sarcostemma Brownei Meyer; Spreng. Syst. 1: 854. 1825.

Philibertia clausa Schum. in Engl. & Prantl, Nat. Pflanzf. 4²: 229. 1895.

Philibertia clausa Vail, Bull. Torr. Club 24: 306. 1897.

A somewhat fleshy, herbaceous vine often 3 m. long or longer. Leaves oblong to oblong-lanceolate or ovate-oblong, short-petioled, 3–8 cm. long, glabrous, acute or acuminate at the apex, rounded or subcordate at the base; peduncles glabrous, longer than the leaves; umbels several-flowered; pedicels slender, puberulent, 7–12 mm. long; calyx puberulent, 4 mm. long, its lobes

oblong-lanceolate; corolla white, 10–12 mm. broad, its lobes oblong or ovate; follicles glabrous, 5–8 cm. long.

Recorded by West and by Eggers as formerly found in St. Croix, and by Krebs in St. Thomas, otherwise unknown within the geographic limits of this Flora:—Florida; Bahamas; Jamaica; Cuba; Hispaniola; Grenada; continental tropical America.

8. **VINCETOXICUM** Walt. Fl. Car. 104. 1788.

Perennial vines, with opposite usually cordate leaves, and rather large flowers in axillary umbel-like cymes or fascicles. Calyx 5-parted or deeply 5-cleft, mostly 5-glandular within. Corolla rotate, very deeply 5-parted, the tube very short, the segments convolute in the bud. Corona double, annular or cup-shaped, adnate to the corolla. Stamens inserted on the base of the corolla, the filaments connate; anthers not appendaged, merely tipped, borne along or just under the margin of the flat-topped stigma, the sacs more or less transversely dehiscent. Pollen-masses solitary in each sac, horizontal or nearly so. Follicles thick, acuminate, smooth, angled or tuberculate. [Greek, subduing poison.] About 75 species, natives of America. Type species: *Vincetoxicum gonocarpum* Walt.

Leaves, at least the larger ones cordate.

Leaves uniformly ovate to ovate-oblong; corolla-segments about 15 mm. long, lanceolate.

Lower leaves broadly ovate-lanceolate, upper linear-lanceolate; corolla-segments about 7 mm. long, suborbicular.

Leaves rounded or subcordate at base; corolla-segments about 5 mm. long.

1. *V. stephanotrichum*.

2. *V. variifolium*.

3. *V. Sintenisii*.

1. **Vincetoxicum stephanotrichum** (Griseb.) Britton.

Gonolobus stephanotrichus Griseb. Cat. Pl. Cub. 177. 1866.

Stem puberulent or glabrate, high-climbing. Leaves ovate to ovate-oblong, 6–10 cm. long, glabrous, the apex acuminate, the base cordate, the slender petioles 1.5–4 cm. long; flowers few in sessile fascicles, greenish brown; pedicels pilose, about 5 mm. long; calyx-segments lanceolate, acuminate, puberulent, about 5 mm. long; corolla-segments narrowly lanceolate, about 15 mm. long, pilose without, long-attenuate, obtusish; outer corona obtusely 5-lobed.

Forests in wet moist districts, Porto Rico:—Cuba.

2. **Vincetoxicum variifolium** (Schlechter) Britton.

Gonolobus variifolius Schlechter in Urban, Symb. Ant. 1: 286. 1899.

High-climbing, the young shoots sparingly puberulent. Leaves various, the lower ovate-lanceolate to elliptic-lanceolate, cordate, acuminate, 2 dm. long or less, the upper linear-lanceolate, rounded at the base, much smaller; umbels short-peduncled in the upper axils; pedicels strigose, 6–8 mm. long; calyx-segments ovate-lanceolate, about one-fourth as long as the corolla; corolla-segments 6–8 mm. long, suborbicular, glabrous; outer corona entire.

Forests and thickets, Sierra de Luquillo and on Monte Cienega near Adjuntas, Porto Rico. Endemic.

3. **Vincetoxicum Sintenisii** (Schlechter) Britton.

Gonolobus Sintenisii Schlechter in Urban, Symb. Ant. 1: 288. 1899.

Stems slender, 3 mm. long or longer, the young shoots pubescent. Leaves ovate to ovate-lanceolate, membranous, 6 cm. long or less, glabrous, the apex acute or acuminate, the base rounded or subcordate, the slender petioles 1–2 cm. long, fascicles few-flowered, sessile or nearly so at the axils; pedicels puberulent,

about 5 mm. long; calyx-segments ovate, about 1.5 mm. long; corolla-segments lanceolate, acute, glabrous, about 5 mm. long; outer corona entire.

Forests at middle and higher elevations in wet districts, Porto Rico. Endemic.

Urban records a barren specimen, perhaps of this genus, collected by Sintenis in forest near Utuado (*Sintenis* 6492).

9. **OXYPETALUM** R. Br.; R. & S. Syst. Veg. 91. 1820.

Vines or herbs, with opposite leaves, the rather large flowers cymose. Calyx 5-parted. Corolla with a short campanulate or subglobose tube and 5 narrow elongated lobes. Corona-scales 5, erect. Stamens borne on the base of the corolla-tube, the filaments connate; anthers with a membranous appendage; pollinia oblong, pendulous. Stigma 2-cleft or 2-parted. Follicles smooth or tuberculate. [Greek, pointed petals.] About 75 species, mostly natives of South America, the following one extending to the West Indies. Type species: *Oxypetalum Banksii* R. & S.

1. **Oxypetalum cordifolium** (Vent.) Schlechter in Urban, Symb. Ant. 1: 269. 1899.

Gothofreda cordifolia Vent. Choix des Plantes 60. 1803.

Oxypetalum riparium H.B.K. Nov. Gen. 3: 197. 1818.

A tomentulose twining slender vine, up to 4 m. long or longer. Leaves ovate or ovate-lanceolate, membranous, 5–10 cm. long, acuminate, deeply cordate, puberulent or glabrate above, pubescent beneath, the slender petioles 3 cm. long or shorter; cymes axillary, few-flowered; peduncles about as long as the petioles; pedicels filiform, shorter than the peduncles; calyx-segments linear-lanceolate, acute; corolla-lobes linear, 1.5–2 cm. long, much longer than the calyx; follicles about 8 cm. long, long-pointed.

Porto Rico, collected by Read (according to Urban); St. Thomas (according to Schlechter).—Jamaica; Cuba; continental tropical America.

Cryptostegia grandiflora R. Br., PURPLE ALLAMANDA, RUBBER-VINE, occasionally planted for ornament in Porto Rico and the Virgin Islands, is a woody, nearly glabrous vine, 3 m. long or longer, with thick elliptic acute leaves 5–9 cm. long, the purple corolla 5–6 cm. long, the divergent woody follicles 10–12 cm. long. It has been cultivated for caoutchouc; its geographical origin is unknown.

Stephanotis floribunda A. Brongn., ESTEPHANOTA, STEPHANOTIS, Madagascar, planted for ornament in Porto Rico and the Virgin Islands, is a high-climbing, glabrous vine, with thick shining elliptic leaves 5–10 cm. long, and large white fragrant flowers in peduncled axillary umbels, the salverform corolla about 5 cm. long with 5 spreading lobes; the fleshy pod is about 10 cm. long. [*Marsdenia floribunda* Schlechter.]

Fischeria crispiflora (Sw.) Schlechter [*Cynanchum crispiflorum* Sw.; *F. scandens* DC.] was recorded by Eggers as found in forests at Spring-gut, St. Croix, but as the species is otherwise known only in Jamaica and Cuba, the determination is doubted.

Stapelia variegata L., of South Africa, a fleshy leafless plant, with clustered 4-angled stems 5–15 cm. high, often purplish, the large malodorous mottled

pedicelled flowers 5–7 cm. broad, was well established in Mr. A. S. Fairchild's collection at Louisenhøj, St. Thomas, in 1924.

Stapelia grandiflora Mass., also successfully grown at Louisenhøj, is similar to *S. variegata* but larger and with much larger flowers, measured by Mr. Fairchild up to over 3 dm. across.

Gomphocarpus fruticosus (L.) R. Br., an African shrub, was recorded by West as cultivated on St. Croix prior to 1793. [*Asclepias fruticosa* L.]

Order 5. POLEMONIALES.

Herbs, shrubs or trees. Corolla almost always gamopetalous, regular or irregular. Stamens adnate to the corolla-tube usually to the middle or beyond, as many as the corolla-lobes, or fewer and alternate with them. Ovary 1, superior, compound (in Boraginaceae and Lamiaceae deeply 4-lobed around the style).

A. Corolla regular. [See Solanaceae and some Verbenaceae.]

1. Ovary not 4-lobed, the carpels not separating as distinct nutlets at maturity.

Ovary 2-celled, rarely 3–4-celled.

Leaves and flowers mostly large; plants not parasitic.

Leaves none; flowers very small; slender parasitic vines.

Ovary 1-celled; style 1, 2-lobed, or 2-parted.

2. Ovary deeply 4-lobed around the style, or not lobed; carpels mostly separating as distinct nutlets.

Ovary not lobed; styles terminal.

Style arising from between the ovary-lobes.

B. Corolla irregular, more or less 2-lipped (regular in Solanaceae, and nearly or quite so in *Verbena* and *Callicarpa* and other genera of the Verbenaceae and in *Scoparia* of the Scrophulariaceae).

1. Carpels 1–2-seeded.

Ovary not lobed, 2–4-celled, the style apical; carpels separating into 1-seeded nutlets or fruit drupaceous.

Ovary 4-lobed around the style, the lobes ripening into 1-seeded nutlets.

2. Carpels several-many-seeded (2-seeded in some Acanthaceae).

†Fruit a berry, or more commonly a capsule which is 1–2-celled, 2-valved, circumscissile, or irregularly bursting, not elastically dehiscent.

Placentae axile.

Flowers regular; fertile stamens 5 (4 in *Petunia*); fruit a berry or capsule.

Flowers more or less irregular; fertile stamens 2 or 4 (5 in *Verbascum*); fruit a capsule.

Ovary 2-celled, rarely 3–5-celled.

Ovary 1-celled; marsh or aquatic herbs with flowers on scapes.

Placentae parietal.

Trees, shrubs, or woody vines; capsule 2-celled, or fruit indehiscent.

Herbs annual or perennial, (or shrubs in Gesneriaceae).

Ovary 2-celled or falsely 4-celled; flowers axillary.

Ovary 1-celled.

Capsule beaked; flowers in terminal racemes.

Capsule not beaked; flowers variously clustered or solitary.

Fam. 1. CONVULVULACEAE.

Fam. 2. CUSCUTACEAE.

Fam. 3. HYDROPHYLLACEAE.

Fam. 4. EHRETIACEAE.

Fam. 5. BORAGINACEAE.

Fam. 6. VERBENACEAE.

Fam. 7. LAMIACEAE.

Fam. 8. SOLANACEAE.

Fam. 9. SCROPHULARIACEAE.

Fam. 10. LENTIBULARIACEAE.

Fam. 11. BIGNONIACEAE.

Fam. 12. PEDALIACEAE.

Fam. 13. MARTYNIACEAE.

Fam. 14. GESNERIACEAE.

††Capsule completely 2-celled, elastically loculicidally dehiscent; opposite-leaved herbs and shrubs; placentae axile.

3. Ovary 2-celled with 1 ovule in each cavity; trees or shrubs with alternate leaves.

Fam. 15. ACANTHACEAE.

Fam. 16. MYOPORACEAE.

Family 1. **CONVOLVULACEAE** Vent.

MORNING-GLORY FAMILY.

Herbs or vines, some tropical species shrubs or trees, with alternate estipulate leaves, and regular perfect axillary cymose or solitary flowers. Calyx inferior, 5-parted or 5-divided, usually persistent, the segments or sepals imbricated. Corolla gamopetalous, the limb 5-angled, 5-lobed or entire. Stamens 5, inserted low down on the tube of the corolla and alternate with its lobes, all anther-bearing, the filaments filiform, or dilated at the base; anthers 2-celled, the sacs longitudinally dehiscent. Disk annular or none. Ovary superior, sessile, 2-3-celled, with 2 ovules in each cavity, or falsely 4-6-celled with a single ovule in each cavity, usually entire; styles 1-3, terminal, ovules anatropous. Fruit mostly a 2-4-valved capsule. Seeds erect, the testa villous, pubescent or glabrous; embryo plaited or crumpled; cotyledons foliaceous; endosperm fleshy or cartilaginous, usually scanty. About 45 genera and probably 1,000 species or more, of wide distribution. The generic limitations within this family are not wholly satisfactory.

A. Capsule dehiscent by valves or rarely operculate.

1. Capsule dehiscent by valves.

a. Styles separate nearly or quite to the base.

b. Styles united up to the stigma or stigmas.

*Stigmas oval, oblong or linear, flattened.

Flowers cymose or paniced; bracts small.

Flowers capitate; bracts large, foliaceous.

**Stigma or stigmas globose.

†Stamens and style exserted; corolla salverform or funnelform.

Corolla large, white; flowers nocturnal.

Corolla small, mostly red or scarlet.

Ovary 4-celled.

Ovary 2-celled.

††Stamens and style included; corolla campanulate or funnelform.

2. Capsule operculate.

B. Capsule indehiscent.

Sepals much enlarged in fruit, appressed; ovary 4-celled; fruit baccate.

Sepals little enlarged in fruit; ovary 2-celled; fruit woody.

1. *Evolvulus*.

2. *Jacquemontia*.

3. *Thyella*.

4. *Calonyction*.

5. *Quamoclit*.

6. *Exogonium*.

7. *Ipomoea*.

8. *Operculina*.

9. *Rivea*.

10. *Turbina*.

1. **EVOLVULUS** L. Sp. Pl. ed. 2, 391. 1762.

Mostly silky-pubescent or pilose herbs, or low shrubs, with small leaves, and axillary small flowers. Sepals nearly equal. Corolla funnelform, campanulate or rotate, the limb plaited, 5-angled or 5-lobed. Filaments filiform; anthers ovate or oblong. Ovary entire, 2-celled; styles separate to the base, or near it, each division deeply 2-cleft; stigmas linear-filiform. Capsule 2-4-valved, 1-4-seeded. Seeds glabrous. [Latin, unrolling.] About 85 species, of warm and tropical regions. Type species: *Evolvulus nummularius* L.

Erect low shrub with small narrow or scale-like leaves.

Prostrate, creeping or erect herbs.

Leaves suborbicular to orbicular-obovate, rounded or notched at the apex.

Leaves linear to oblong or obovate, acute or mucronate.

Peduncles 1-flowered, very short, much shorter than the leaves.

Peduncles filiform, elongated, 1-several-flowered, mostly as long as the leaves or longer.

1. *E. squamosus*.

2. *E. nummularius*.

3. *E. sericeus*.

Leaves oblong-obovate, mucronulate; sepals about one-third as long as corolla.

Leaves linear-lanceolate to oblong, acute or obtusish; sepals at least one-half as long as corolla.

4. *E. glaber*.

5. *E. linifolius*.

1. *Evolvulus squamosus* Britton, Bull. N. Y. Bot. Gard. 3: 449. 1905.

An intricately branched erect shrub, 3 dm. high or less, the slender terete twigs densely appressed-pubescent. Leaves scattered, reduced to mere lanceolate-acuminate scales, 2 mm. long or less, appressed-pubescent; flowers solitary in the upper axils, on appressed-pubescent peduncles, which are about as long as the calyx; sepals ovate, acute, appressed-pubescent, about one-half as long as the white corolla, or less; corolla about 6 mm. broad, slightly 5-lobed, the broad lobes a little emarginate; stamens a little shorter than the corolla, their filaments filiform, their anthers oval, short; ovary densely pubescent, oblong; styles 2, 2-cleft to about the middle.

Occasional on the rocky plain of Anegada:—Bahamas.

2. *Evolvulus nummularius* L. Sp. Pl. ed. 2, 391. 1762.

Diffuse, herbaceous, the stems 5–20 cm. long, branched, the branches rooting at the nodes, pilose or glabrate. Leaves orbicular or broadly oval, 4–20 mm. long, rounded or retuse at the apex, obtuse or subcordate at the base, short-petioled, pilose or glabrate; peduncles 1-flowered, much shorter than the leaves; sepals oblong or oblong-obovate, obtuse, about 2 mm. long; corolla pale blue or white, 5–8 mm. in diameter; capsule globose, 2 mm. in diameter.

Shaded banks and hillsides at lower elevations, Porto Rico; St. Croix; St. Thomas; St. Jan:—West Indies; continental tropical America; tropical Africa.

3. *Evolvulus sericeus* Sw. Prodr. 55. 1788.

Herbaceous, erect or ascending, usually branched from near the base, slender, silky-pubescent, 1–3 dm. high. Leaves linear, lanceolate or narrowly oblanceolate, nearly sessile, 1–2.5 cm. long, about 3 mm. wide or less, acute or acuminate; peduncles 1-flowered, much shorter than the leaves, often shorter than the calyx; sepals lanceolate to ovate-lanceolate, acute or acuminate, 3–4 mm. long; corolla white or pale blue, 6–10 mm. broad; capsule subglobose, about as long as the calyx.

Serpentine slopes near Mayaguez, Porto Rico; Tortola; Anegada:—southeastern United States; Bahamas; Jamaica; Cuba; Hispaniola; St. Martin to Trinidad; continental tropical America.

4. *Evolvulus glaber* Spreng. Syst. 1: 862. 1825.

Evolvulus mucronatus Sw.; Wikstr. Vet. Akad. Handl. Stockh. 1827: 61. 1827.

Evolvulus glabriusculus Choisy, Conv. Rar. 156. 1838.

Finely silky-pubescent when young, becoming glabrate, branched, the branches very slender, prostrate or ascending, 4 dm. long or less. Leaves oblong to obovate, 1–3 cm. long, mucronate, short-petioled; peduncles nearly filiform, as long as the leaves or longer; pedicels longer than the flowers; sepals oblong or ovate-oblong, acute, 3–4.5 mm. long; corolla rotate, white, 7–10 mm. broad; capsule subglobose, 2–2.5 mm. in diameter.

Moist grounds, southern districts of Porto Rico near the coast; Mona; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda; Anegada:—Florida; West Indies; northern South America.

5. *Evolvulus linifolius* L. Sp. Pl. ed. 2: 392. 1762.

Pubescent or glabrate; stems several or many from a rather slender root, simple or few-branched, diffuse or nearly erect, 4 dm. long or less. Leaves

lanceolate, linear-lanceolate or linear-oblong, 1–2 cm. long, acute or mucronate, nearly sessile; peduncles filiform, 1–3-flowered, mostly longer than the leaves; sepals lanceolate, acute or acuminate, 2–3 mm. long; corolla white or pale blue, 5–6 mm. broad; capsule longer than the calyx.

Recorded by Schlechtendal as found on St. Croix and St. Thomas, by Krebs as from St. Thomas and by Eggers as on all the Virgin Islands; not known to us within the geographic limits of this Flora:—Bahamas (according to Grisebach); Jamaica; continental tropical America; Old World tropics.

Evolvulus bocasanus Britton, an herbaceous species, native of Trinidad and Venezuela, was seen in cultivation by Mr. A. S. Fairchild, at Louisenhøj, St. Thomas, in 1923; it has slender erect stems about 4 dm. high, lanceolate sessile leaves 2–5 cm. long and bright blue flowers 10–12 mm. broad, the calyx tomentose.

2. **JACQUEMONTIA** Choisy, Mem. Soc. Phys. Gen. 6: 476. 1833.

Trailing or climbing vines, mostly herbaceous, the leaves usually entire, the violet blue or white flowers cymose or paniced. Bracts small. Sepals nearly equal or the outer ones larger than the inner. Corolla campanulate or rotate-campanulate, the limb 5-angled. Stamens shorter than the corolla; filaments filiform, or their bases dilated; anthers oblong. Ovary 2-celled; ovules mostly 4; united styles filiform; stigmas 2, flattened. Capsule 2-celled. [Commemorates Victor Jacquemont, a French botanical traveller, died 1828.] Thirty species or more, of tropical and subtropical America. Type species: *Convolvulus coerulescens* Schum.

Peduncles as long as the leaves or longer.

Peduncles much shorter than the leaves.

Corolla only 3–4 mm. broad.

Corolla 8–15 mm. broad.

Densely pubescent or tomentose.

Glabrate or sparingly pubescent.

Corolla white, whitish or yellowish.

Leaves linear to oblong-lanceolate.

Leaves ovate-oval to suborbicular, fleshy.

Corolla bright blue or lavender.

1. *J. pentantha*.

2. *J. verticillata*.

3. *J. nodiflora*.

4. *J. jamaicensis*.

5. *J. cayensis*.

6. *J. subsalina*.

1. **Jacquemontia pentantha** (Jacq.) G. Don, Gen. Syst. 4: 283. 1838.

Convolvulus pentanthos Jacq. Coll. 4: 210. 1790.

Convolvulus violaceus Vahl, Symb. 3: 29. 1794.

Jacquemontia violacea Choisy, Mem. Soc. Phys. Gen. 8: 61. 1838.

Slender, glabrate or densely pubescent, 0.5–2 m. long, sometimes much branched. Leaves ovate, 2–4 cm. long, slender-petioled, entire or slightly repand, acute or acuminate at the apex, cordate at the base; peduncles slender, mostly as long as the leaves or longer; cymes dense, several-flowered; pedicels usually shorter than the calyx; sepals ovate to lanceolate, acute or acuminate, 5–7 mm. long, the outer broader than the inner; corolla blue, rarely white, 2–3 cm. broad; capsule subglobose, about as long as the sepals or a little shorter. [*Convolvulus umbellatus* of Sessé and Moçino, not of Linnaeus.]

Thickets, banks and hillsides, Porto Rico, at lower and middle elevations; Mona; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Florida; West Indies; south to Barbados; continental tropical America. AGUINALDO AZUL.

2. **Jacquemontia verticillata** (L.) Urban, Symb. Ant. 3: 339. 1902.

Ipomoea verticillata L. Syst. ed. 10, 924. 1759.

Convolvulus micranthus R. & S. Syst. 4: 276. 1819.

Jacquemontia micrantha G. Don, Gen. Syst. 4: 283. 1838.

Stems very slender, appressed-pubescent at least above, 2 m. long or less. Leaves oblong to lanceolate, membranous, repand or entire-margined, 1.5–4 cm.

long, mucronulate at the apex, cordate or subcordate at the base, more or less pubescent, short-petioled; cymes sessile or very short-peduncled, several-flowered; pedicels about as long as the sepals; sepals ovate-lanceolate, acute, 2.5–3 mm. long; corolla 3–4 mm. broad, purple or pink, its limb 5-cleft; capsule globose, 2–3 mm. in diameter; seeds brownish, rugulose.

Limestone cliffs, northern districts of Porto Rico;—Jamaica; Cuba; Hispaniola.

3. *Jacquemontia nodiflora* (Desv.) G. Don, Gen. Syst. 4: 283. 1838.

Convolvulus nodiflorus Desv. in Lam. Encycl. 3: 557. 1789.

Densely pubescent or tomentose, or the stems glabrate below, 2–6 m. long. Leaves ovate, 2–6 cm. long, the apex acute, mucronate, the base rounded or cordate, the slender petioles about 2 cm. long or shorter; cymes several-flowered, short-peduncled; pedicels 3–6 mm. long; sepals 2–3 mm. long, rounded; corolla white, about 2 cm. in diameter; stigmas slender; capsule globose, 3–4 mm. in diameter. [*C. biflorus* of Sessé and Moçino, not of Linnaeus; *Convolvulus albiflorus* of West.]

Banks and thickets in the dry southern districts at lower and middle elevations and near Cape San Juan, Porto Rico; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda;—Jamaica; Cuba; Hispaniola; St. Martin to Trinidad; Bonaire; Curaçao; Mexico and continental tropical America. AGUINALDO BLANCO.

4. *Jacquemontia jamaicensis* (Jacq.) Hallier f.; Solereder, Syst. Anat. 641. 1899.

Convolvulus jamaicensis Jacq. Obs. 3: 6. 1768.

Finely pubescent or glabrate; stems slender, 1–2 m. long. Leaves lanceolate to linear or oblong, rather firm in texture, short-petioled, 1.5–4 cm. long, obtuse, mucronulate or acute at the apex, narrowed or rounded at the base, sparingly pubescent or glabrate; cymes 1–several-flowered, short-peduncled; sepals broad, ovate, acute, about 2 mm. long; corolla white or purplish, 1–1.5 cm. broad, the limb 5-cleft, the narrow segments acute; capsule subglobose, about 4 mm. long; seeds rough.

Thickets and dunes along and near the dry southern coast, and near Bayamon, Porto Rico; Mona; Culebra; Vieques; St. Croix; St. Thomas; Tortola;—Florida; Bahamas; Jamaica; Cuba; Hispaniola; Cayman Islands; recorded from Yucatan. AGUINALDO DE COSTA.

5. *Jacquemontia cayensis* Britton; Britton & Millspaugh, Bahama Fl. 349. 1920.

Stem rather stout, somewhat woody, branched, trailing or ascending, 0.5–2.5 m. long, finely pubescent or glabrate. Leaves fleshy, oval to ovate-orbicular, entire, 1–3 cm. long, obtuse, retuse or acute at the apex, narrowed or rounded at the base, short-petioled, sparingly pubescent or glabrous; peduncles shorter than the leaves; cymes few-flowered; sepals ovate, apiculate, about 2 mm. long; corolla white or yellowish, 2–2.5 cm. broad, 5-cleft, 8–12 mm. broad; capsule ovoid-globose, about 5 mm. long.

Sandy plain, West End, Anegada;—Bahamas. The plant of Anegada was at first referred to *J. reclinata* House, a Florida species.

6. *Jacquemontia subsalina* Britton, spec. nov.

Prostrate, rooting at the nodes and forming mats, slightly fleshy, about 5 dm. long or less, the slender branches loosely strigose. Leaves oval to suborbicular, glabrous, 1–3 cm. long, the apex emarginate or rounded, the base obtuse, the petioles 2–10 mm. long; peduncles short, 1-flowered, curved in fruit; sepals un-

equal, the larger oval, rounded, about 3 mm. long; corolla bright blue or lavender, about 1 cm. wide; capsule subglobose, about 4 mm. in diameter.

Subsaline soil, southern coastal plain of Porto Rico:—Jamaica; Cuba. Type from coastal marsh between Ponce and Santa Isabel, Porto Rico (*Britton and Brown 5515*).

3. **THYELLA** Raf. Fl. Tell. 4: 84. 1838.

Mostly slender twining vines, with alternate leaves, and blue or white, capitate flowers subtended by foliaceous bracts. Sepals equal, narrow. Corolla campanulate, 5-angled or 5-lobed, plaited. Stamens 5, not longer than the corolla. Ovary 2-celled; styles united; stigmas 2, ovate, flattened. Capsule 4-valved. [Greek, a harpy.] Perhaps a dozen species, natives of tropical and warm-temperate America, the following typical.

1. **Thyella tamnifolia** (L.) Raf. Fl. Tell. 4: 84. 1836.

Ipomoea tamnifolia L. Sp. Pl. 162. 1753.

Jacquemontia tamnifolia Griseb. Fl. Br. W. I. 474. 1861.

Stems densely pilose, 1.5 m. long or less, or sometimes nearly erect and 1.5–3 dm. high. Leaves ovate, entire, thin, 3–12 cm. long, the lower slender-petioled, the upper short-petioled, the apex acuminate or acute, the base cordate, both surfaces loosely pilose, or glabrate; peduncles densely pilose, 2–15 cm. long; heads densely many-flowered, the outer bracts ovate, 1–3 cm. long; sepals linear, acuminate, pilose, 1–1.5 cm. long; corolla blue, about 1 cm. in diameter; capsule much shorter than the sepals.

Sandy plains, banks and slopes at lower elevations, northern and western districts of Porto Rico; St. Croix; St. Thomas; St. Jan (according to Eggers):—Cuba; Hispaniola; Guadeloupe to Trinidad; continental tropical America and tropical Africa. AGUINALDO PELUDO.

4. **CALONYCTION** Choisy, Mem. Soc. Phys. Genève 6: 440. 1833.

Long twining vines, with large, entire or 3-lobed leaves and large white nocturnal flowers. Sepals herbaceous or subcoriaceous, the outer appendaged or unappendaged. Corolla long-salverform with a nearly cylindric tube. Stamens and style exserted. Styles united; stigmas globose. Fruit a dehiscent capsule. [Greek, night-beauty.] A few species, of tropical regions. Type species: *Calonyction speciosum* Choisy.

Outer sepals with infraterminal tail-like appendages; stems more or less aculeate.

Outer sepals without appendages; stems not aculeate.

1. *C. aculeatum*.
2. *C. Tuba*.

1. **Calonyction aculeatum** (L.) House, Bull. Torr. Club 31: 590. 1904.

Convolvulus aculeatus L. Sp. Pl. 155. 1753.

Ipomoea bona-nox L. Sp. Pl. ed. 2, 228. 1762.

Calonyction speciosum Choisy, Mem. Soc. Phys. Gen. 6: 441. 1833.

Calonyction megalocarpum A. Rich. in Sagra, Hist. Cub. 11: 129. 1850.

Ipomoea aculeata Kuntze, Rev. Gen. Pl. 442. 1891.

Glabrous, trailing or high-climbing, sometimes 20 m. long or longer, the sap milky. Leaves orbicular-ovate, membranous, 5–15 cm. long, entire, repand or sometimes 3-lobed, long-petioled, acuminate at the apex, deeply cordate at the base; peduncles 1–several-flowered, stout, shorter than the leaves; sepals about 1 cm. long, appressed, the outer subulate-appendaged; corolla-tube slender, 10–12 cm. long, the limb 8–10 cm. wide, each lobe with a broad green median

band terminating in a cusp; capsule ovoid, pointed, about 2 cm. long; seeds glabrous or nearly so.

Thickets at lower elevations, Porto Rico, in moist districts; much planted for ornament in Porto Rico and the Virgin Islands and often spontaneous after cultivation:—Florida; West Indies; continental tropical America and Old World tropics. BEJUCO DE VACA. MOON-VINE.

2. *Calonyction Tuba* (Schlecht.) Colla, Nov. Sp. Calon. 15. 1840.

Convolvulus Tuba Schlecht. Linnaea 6: 735. 1831.

Calonyction grandiflorum Choisy, Mem. Soc. Phys. Genève 6: 442. 1833.

Ipomoea Tuba G. Don, Gen. Syst. 4: 271. 1838.

Calonyction album House, Bull. Torr. Club 31: 591. 1904. Not *Ipomoea alba* L. 1753.

Glabrous, fleshy, usually climbing, sometimes 10 m. long. Leaves ovate-orbicular, slender-petioled, 6–10 cm. long, acute or short-acuminate at the apex, deeply cordate at the base; peduncles stout, 1–2-flowered, shorter than the leaves; sepals ovate-oblong, obtuse, appressed, about 2 cm. long; corolla white, its tube stout, cylindric, 5–6 cm. long, the limb 5–6 cm. broad, with 5 narrow greenish bands; capsule subglobose, 2–2.5 cm. in diameter; seeds densely puberulent, villous on the angles and at the hilum.

Coastal thickets, Porto Rico; Mona; Icacos; St. Croix; St. Thomas; St. Jan:—Florida; West Indies; continental tropical America; Old World tropics. COAST MOON-VINE.

5. *QUAMOCLIT* [Tourn.] Moench, Meth. 453. 1794.

Twining herbaceous vines, with petioled leaves, and peduncled axillary flowers. Sepals 5, herbaceous, equal, acuminate, mucronate or appendaged. Corolla salverform, scarlet, or rarely white, the tube longer than the spreading limb. Stamens and united styles exserted; stigma capitate; ovary 2-celled or falsely 4-celled, 4-ovuled. Capsule usually 4-celled and 4-seeded. [Greek, dwarf kidney-bean.] About 10 species, of warm and tropical regions. Type species: *Ipomoea coccinea* L.

Leaves pinnately parted into very narrow segments.
Leaves cordate, acuminate, entire or angulate-lobed.

1. *Q. Quamoclit*.
2. *Q. coccinea*.

1. *Quamoclit Quamoclit* (L.) Britton in Britton & Brown, Ill. Fl. 3: 22. 1898.

Ipomoea Quamoclit L. Sp. Pl. 159. 1753.

Quamoclit vulgaris Choisy in DC. Prodr. 9: 336. 1845.

Annual, glabrous. Leaves ovate in outline, 5–18 cm. long, pinnately parted into segments less than 2 mm. wide; peduncles 1–6-flowered; pedicels thickening in fruit; sepals obtuse, usually mucronate, 4–6 mm. long; corolla 2.5–4 cm. long, the tube expanded above, the limb nearly flat, the lobes ovate, acutish; ovary 4-celled; capsule ovoid, 4-valved, about 1 cm. high, twice as long as the sepals.

Banks, thickets and cultivated grounds, Porto Rico, mostly spontaneous after cultivation; St. Croix; St. Thomas; commonly grown for ornament:—southern and eastern United States; West Indies; continental tropical America and Old World tropics. The race with white flowers was observed on a roadside bank near Barceloneta, Porto Rico. CAMBUSTERA. CYPRESS-VINE. SWEET WILLIAM. INDIAN CREEPER.

2. *Quamoclit coccinea* (L.) Moench, Meth. 453. 1794.

Ipomoea coccinea L. Sp. Pl. 160. 1753.

Ipomoea hederæfolia L. Syst. ed. 10, 925. 1759.

Ipomoea sanguinea Vahl, Symb. 3: 33. 1794.

Quamoclit hederæfolia Choisy in DC. Prodr. 9: 336. 1845.

Mina coccinea Bello, Anales Soc. Esp. Hist. Nat. 10: 294. 1881.

Mina hederæfolia Bello, Anales Soc. Esp. Hist. Nat. 10: 294. 1881.

Annual. Leaves ovate to orbicular, long-acuminate, 5–15 cm. long, entire or angulate-lobed, slender-petioled; peduncles few-several-flowered; sepals obtuse, about 4 mm. long, subulate-appendaged; corolla 2–4 cm. long, the limb obscurely 5-lobed; ovary 4-celled; capsule globose, 4-valved, 6–8 mm. in diameter.

Thickets, woods, banks and river valleys at lower elevations, Porto Rico, occasionally planted for ornament; Vieques; St. Croix; St. Thomas; St. Jan:—southeastern United States; West Indies; continental tropical America. CAMBUSTERA.

6. **EXOgonium** Choisy, Mem. Soc. Phys. Genève 6: 443. 1833.

Vines, woody at the base, with alternate leaves and showy, cymose or solitary, axillary flowers. Sepals 5, obtuse, somewhat unequal. Corolla salverform or funnellform. Ovary 2-celled; styles united; stigmas globose. Stamens more or less exserted. Fruit a capsule. [Greek, referring to the exserted stamens and styles.] Some 25 species or more, of tropical and subtropical America. Type species: *Ipomoea bracteata* Cav.

Corolla 2–2.5 cm. long, its limb short; leaves ovate, or ovate-lanceolate.

Corolla about 4 cm. long, its limb spreading.

Leaves large, 4–12 cm. long, entire or 3-lobed.

Leaves small, 2 cm. long or less, emarginate or 2–4-lobed.

1. *E. solanifolium*.

2. *E. repandum*.

3. *E. arenarium*.

1. **Exogonium solanifolium** (L.) Britton, Mem. Brooklyn Bot. Gard. 1: 82. 1918.

Ipomoea solanifolia L. Sp. Pl. 161. 1753.

Ipomoea filiformis Jacq. Enum. 13. 1760.

Convolvulus filiformis Desv. in Lam. Encycl. 3: 555. 1789.

Exogonium filiforme Choisy, Conv. Rar. 129. 1838.

Quamoclit solanifolia Choisy in DC. Prodr. 9: 335. 1845.

A slender glabrous vine, 1–3 m. long. Leaves ovate to ovate-oblong or ovate-lanceolate, thin, entire, 2–5 cm. long, the apex obtuse, aristulate, rarely emarginate, the base rounded or cordate, the slender petioles 0.5–3 cm. long; peduncles about as long as the leaves or longer, few-several-flowered; pedicels nearly filiform, 1–3 cm. long; sepals ovate, acute, about 5 mm. long; corolla crimson or scarlet, 2–2.5 cm. long, salverform, its limb very short; capsule 4–5 mm. in diameter; seeds glabrous.

Coastal thickets, northern and western districts of Porto Rico, and at Utuado; Vieques; St. Croix; St. Thomas:—St. Barts to St. Vincent. CAMBUSTERA DE COSTA.

2. **Exogonium repandum** (Jacq.) Choisy, Conv. Rar. 128. 1838.

Ipomoea repanda Jacq. Enum. 13. 1760.

High-climbing, glabrous, up to 10 m. in length. Leaves various, ovate to lanceolate, entire, repand or some of them deeply 3–5-lobed, 5–16 cm. long, the apex acute or acuminate, the base rounded or cordate, the slender petioles 2–12 cm. long; inflorescence axillary, mostly long-peduncled, few-several-flowered; pedicels rather stout, 2 cm. long or less; sepals ovate, rounded, 6–8 mm. long; corolla crimson or scarlet, about 4 cm. long, its narrow lobes about one-fourth as long as the nearly cylindric tube; capsule globose-ovoid, about 1 cm. long, tipped by the base of the style; seeds long-woolly.

Mountain forests, Porto Rico; St. Thomas; St. Jan; Tortola:—Montserrat to Grenada.

3. *Exogonium arenarium* Choisy, Conv. Rar. 129. 1838.

Ipomoea arenaria Steud. Nom. 815. 1840.

Ipomoea Steudelii Millsp. Field Mus. Bot. 2: 86. 1900.

Ipomoea Eggersiana Peter in E. & P. Nat. Pfl. 4^{3a}: 30. 1899.

Exogonium Eggersii House, Bull. Torr. Club 35: 104. 1908.

A slender glabrous, trailing or twining vine, up to 4 m. long or longer. Leaves small, thin, various, ovate to suborbicular in outline, 0.5–2 cm. long, filiform-petioled, entire, emarginate, obcordate or 2-lobed or 4-lobed, the lobes ovate to oblong or linear, obtuse, the base cordate or rounded; peduncles stout, short, 1–4-flowered; sepals ovate-orbicular, rounded, about 6 mm. long; corolla 3–4 mm. long, crimson, rose, lilac, purplish or white, salverform, the spreading limb with short rounded lobes; capsule ovoid, 10–15 mm. long; seeds long-woolly. [*Exogonium pedatum* of Bello, not of Choisy.]

Thickets at lower and middle elevations in the dry southern and western districts and near Rincon. Porto Rico; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Virgin Gorda;—Hispaniola; Anguilla; St. Martin. A plant of great variability in foliage and corolla, strikingly conspicuous when in flower.

A vine, growing on the limestone plateau of Mona Island, known only from incomplete specimens, has been tentatively referred to *Exogonium microdactylum* (Griseb.) House, otherwise known from Florida, Cuba and the Bahamas. (Ann. Mo. Bot. Gard. 2: 47.)

7. *IPOMOEA* L. Sp. Pl. 159. 1753.

Twining, trailing or rarely erect herbs, with large showy axillary flowers. Corolla funnelform or campanulate, the limb entire, 5-angled or 5-lobed, often plaited. Stamens included. Ovary entire, 2–4-celled, 4–6-celled; styles united, included; stigmas 1 or 2, capitate or globose. Pollen spinose in most species, smooth in others. Capsule usually septifragally 2–4-celled, 2–4-valved, 2–4-seeded. [Greek, worm-like.] About 400 species, of wide distribution. Known as AGUINALDO and MORNING-GLORY. Type species: *Ipomoea Pes-tigrinus* L.

- | | |
|---|------------------------------|
| A. Flowers bright yellow, umbellate. | 1. <i>I. polyanthes</i> . |
| B. Flowers white, red or purple, not umbellate. | |
| 1. Sepals much enlarged in fruit; leaves pedately dissected. | 2. <i>I. dissecta</i> . |
| 2. Sepals little if at all enlarged in fruit; leaves entire, lobed or pedate. | |
| a. Sepals herbaceous, elongated. | |
| *Leaves pedate; stems and calyx long-villous. | 3. <i>I. aegyptia</i> . |
| **Leaves entire or 3-lobed, cordate or sagittate. | |
| Sepals glabrous. | |
| Sepals aristulate. | 4. <i>I. rubra</i> . |
| Sepals acuminate. | 5. <i>I. cathartica</i> . |
| Sepals hirsute or villous at least below. | |
| Sepals with long linear tips. | 6. <i>I. Nil</i> . |
| Sepals linear or linear-lanceolate. | |
| Sepals 1–1.5 cm. long; corolla 5–6 cm. long. | 7. <i>I. purpurea</i> . |
| Sepals 2–3 cm. long; corolla 2–3 cm. long. | 8. <i>I. Meyeri</i> . |
| b. Sepals coriaceous or subherbaceous, not elongated. | |
| *Stems prostrate or stoloniferous; plants fleshy; littoral species. | |
| Leaves suborbicular, emarginate; flowers purple; stems long, prostrate. | 9. <i>I. Pes-caprae</i> . |
| Leaves various, entire or lobed; flowers white; stems stoloniferous. | 10. <i>I. stolonifera</i> . |
| **Stems twining or trailing. | |
| †Seds comose, woolly or pubescent. | |
| Leaves pedately 5–7-foliolate. | |
| Corolla rose, 5–6 cm. long. | 11. <i>I. Horsfalliae</i> . |
| Corolla white to violet, 1.5–3 cm. long. | |
| Corolla white or light yellow, 1.5–2 cm. long; leaflets serrate. | 12. <i>I. quinquefolia</i> . |
| Corolla violet, 2.5–3 cm. long; leaflets entire. | 13. <i>I. heptaphylla</i> . |
| Leaves entire, cordate. | |
| Sepals about 5 mm. long. | 14. <i>I. carnea</i> . |

- Sepals 10–13 mm. long.
 ††Seeds glabrous. 15. *I. calantha*.
 †Leaves linear to lanceolate.
 Leaves with a few short lobes near the base,
 almost sessile. 16. *I. angustifolia*.
 Leaves sagittate, slender-petioled. 17. *I. tenuissima*.
 ††Leaves ovate to ovate-lanceolate, entire or lobed.
 Sepals awned or acuminate.
 Sepals pilose or ciliate. 18. *I. triloba*.
 Sepals glabrous.
 Twining, glabrous or pubescent; leaves
 ovate, cordate.
 Corolla about 3.5 cm. long. 19. *I. Krugii*.
 Corolla 5–6 cm. long. 20. *I. tiliacea*.
 Prostrate, glabrous; leaves various,
 entire or lobed. 21. *I. Batatas*.
 Sepals obtuse, scarious-margined. 22. *I. tricolor*.

1. *Ipomoea polyanthes* R. & S. Syst. 4: 234. 1819.

Convolvulus umbellatus L. Sp. Pl. 155. 1753. Not *Ipomoea umbellata* L.
Ipomoea umbellata Meyer, Prim. Fl. Ess. 99. 1818.
Convolvulus sagittifer H.B.K. Nov. Gen. 3: 100. 1819.
Ipomoea mollicoma Miquel, Stirp. Sur. Sel. 132. 1850.
Merremia umbellata Hall. f. Bot. Jahrb. 16: 552. 1893.

Stem twining, glabrous, or when young puberulent, 1–5 m. long or longer. Leaves ovate to lanceolate or sometimes suborbicular, 4–9 cm. long, puberulent on both sides or glabrate, entire or slightly repand, the apex acuminate, acute, obtuse or rounded, the base cordate, the petioles nearly as long as the blades or shorter; inflorescence long-peduncled, umbelliform, few-several-flowered; pedicels 1–3 cm. long; sepals oval, obtuse, mucronulate, about 8 mm. long; corolla bright yellow, 2–2.5 cm. long, funnelform-campanulate; ovary 2-celled; capsule subglobose, about 10 mm. broad; seeds velvety.

Banks and thickets at lower elevations, Porto Rico; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Florida; Jamaica; Cuba; Hispaniola; St. Barts to Trinidad; continental tropical America and Old World tropics. AGUINALDO AMARILLO. YELLOW MORNING-GLORY.

2. *Ipomoea dissecta* (Jacq.) Pursh, Fl. Am. Sept. 145. 1814.

Convolvulus dissectus Jacq. Obs. 2: 4. 1767.
Ipomoea sinuata Ortega, Hort. Matr. Dec. 84. 1798.
Merremia dissecta Hall. f. Bot. Jahrb. 16: 552. 1893.
Operculina dissecta House, Bull. Torr. Club 33: 500. 1906.

Perennial, villous-hirsute, or glabrate. Stems twining, branching; leaves suborbicular, 3–10 cm. in diameter, 5–7-parted, the segments oval to oblong or lanceolate, coarsely toothed or pinnatifid; petioles as long as the blades or longer, villous-hirsute; sepals glabrate, oblong to oblong-oval, 1–2.5 cm. long; obtuse; corolla white with purple throat, its tube funnelform, 2–3 cm. long, its limb 3–5 cm. broad; capsules about 1.5 cm. long; seeds smooth and glabrous.

Thickets at lower elevations, Porto Rico, occasionally planted for ornament; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—southeastern United States; West Indies; continental tropical America and Old World tropics. NOYO. NOYAU VINE.

3. *Ipomoea aegyptia* L. Sp. Pl. 162. 1753.

Convolvulus pentaphyllus L. Sp. Pl. ed. 2, 223. 1762.
Ipomoea pentaphylla Jacq. Coll. 2: 297. 1788.
Batatas pentaphylla Choisy, Conv. Or. 54. 1833.
Merremia pentaphylla Hall. f. Bot. Jahrb. 16: 552. 1893.
Operculina aegyptia House, Bull. Torr. Club 33: 502. 1906.
Merremia aegyptia Urban, Symb. Ant. 4: 505. 1910.

Twining, 2–4 m. long or longer, the branches, petioles, inflorescence and sepals long-pilose. Leaves long-petioled, pedately 5-foliolate, the segments

sessile, entire, thin, elliptic or elliptic-lanceolate, 3–9 cm. long, sparingly long-pilose, the apex acuminate, the base narrowed; peduncles commonly longer than the petioles, 1–few-flowered; pedicels 1–5 cm. long; sepals thin, ovate to ovate-oblong, acute or acutish, unequal, the outer ones 2–2.5 cm. long; corolla white, about 3 cm. long; ovary 4-celled; capsule subglobose, about 1.5 cm. broad; seeds smooth.

Banks, fields and thickets at low elevations, Porto Rico, in dry and moist districts; Mona; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Jamaica; Cuba; Hispaniola; St. Martin to Trinidad; Curaçao; continental tropical America and Old World tropics; Hawaii.

4. *Ipomoea rubra* (Vahl) Millsp. Field Mus. Bot. 2: 86. 1900.

Convolvulus ruber Vahl, Eclog. 2: 12. 1798.

Ipomoea setifera Poir. in Lam. Encycl. 6: 17. 1804.

Ipomoea rubra alboflavida Urban, Symb. Ant. 3: 345. 1902.

Ipomoea rubra palustris Urban, Symb. Ant. 3: 345. 1902.

Stem prostrate or twining, 1–3 m. long, glabrous, or pilose below, the young parts sometimes minutely puberulent. Leaves ovate, glabrous, long-petioled, 5–15 cm. long, entire or slightly repand, the apex obtuse or acute, the base cordate or sagittate; peduncles stout, mostly shorter than the leaves, 1–few-flowered; flowers bracteate, the bracts ovate or ovate-lanceolate, 6–15 mm. long, acuminate with a terminal bristle; outer sepals ovate, about as long as the bracts, also with a terminal bristle; corolla purple, rarely yellowish-white, 3–6 cm. long; capsule subglobose, about 1 cm. thick; seeds tomentose. [*I. ciliolata* of Stahl, not of Persoon; *Convolvulus sagittatus* of Sessé & Mocino.]

Wet or moist soil, northeastern districts of Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Martinique; St. Vincent; Trinidad; central and South America; tropical Africa. Recorded by Krebs from St. Thomas. BEJUCO DE PUERCO.

5. *Ipomoea cathartica* Poir. in Lam. Encycl. Suppl. 4: 633. 1816.

Convolvulus acuminatus Vahl, Symb. 3: 26. 1794. Not *I. acuminata* R. & P.

Convolvulus portoricensis Spreng. Syst. 1: 595. 1825.

Ipomoea portoricensis G. Don. Gen. Syst. 4: 278. 1838.

Pharbitis acuminata Choisy, in DC. Prodr. 9: 342. 1845.

Pharbitis cathartica Choisy in DC. Prodr. 9: 342. 1845.

Ipomoea jamaicensis glabrata Griseb. Fl. Br. W. I. 474. 1861.

Twining, minutely strigillose or glabrate, 1–5 m. long or longer. Leaves broadly ovate, 5–9 cm. long, entire or 3-lobed, acuminate, cordate; peduncles shorter than the subtending petioles, 1–few-flowered; sepals glabrate, linear-lanceolate or ovate-lanceolate, 1–2 cm. long, acuminate; corolla pink-purple or crimson, 5–7 cm. long, the limb 6–8 cm. broad, undulate; capsules spheroidal, about 1 cm. broad; seeds glabrous, about 3 mm. in diameter.

Thickets, banks, waste and cultivated grounds, Porto Rico, at lower elevations; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Florida; Bermuda; West Indies; continental tropical America. BEJUCO DE GLORIA.

6. *Ipomoea Nil* (L.) Roth, Cat. 1: 36. 1797.

Convolvulus Nil L. Sp. Pl. ed. 2, 219. 1762.

Pharbitis Nil Choisy, Conv. Or. 57. 1833.

Pilose, the stems twining or trailing, 0.5–2 m. long. Leaves ovate to sub-orbicular, 3-lobed or some of them nearly entire, thin, 5–15 cm. broad, mostly long-petioled, the lobes ovate, acuminate or acute, the base cordate; peduncles about as long as the petioles or shorter, 1–5-flowered; pedicels short; sepals 1.5–2.5 cm. long, linear with a broadened base, pilose; corolla blue, fading purple, 3–4 cm. long, its limb 4–5 cm. broad; ovary 3-celled; capsule globose, 8–12 mm.

in diameter; seeds finely pubescent. [*Ipomoea hederacea barbata* of Kuntze; ? *Convolvulus hederaceus* of Schlechtendal.]

Banks, thickets, waste and cultivated grounds at lower elevations, Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan:—Florida; Bermuda; West Indies (except Bahamas); continental tropical America; Old World tropics; Hawaii.

7. *Ipomoea purpurea* (L.) Lam. Tabl. Encycl. 1: 466. 1791.

Convolvulus purpureus L. Sp. Pl. ed. 2, 219. 1762.

Pharbitis hispida Choisy, Conv. Or. 56. 1833.

Stem retrorsely pubescent, twining or trailing, about 3 m. long or shorter. Leaves broadly ovate, membranous, entire, sparingly pubescent, long-petioled, 5–12 cm. broad, the apex acute or acuminate, the base cordate; peduncles retrorsely pubescent, commonly longer than the petioles, 1–5-flowered; sepals lanceolate, or oblong-lanceolate, acute, 10–16 mm. long, pilose below; corolla purple, blue or white, 5–6 cm. long; ovary mostly 3-celled; capsule depressed-globose, about 10 mm. in diameter; seeds smooth.

Occasionally spontaneous after cultivation in Porto Rico, planted for ornament in Porto Rico and the Virgin Islands:—widely planted as an ornamental vine in temperate and tropical regions; native of continental tropical America.

8. *Ipomoea Meyeri* (Spreng.) G. Don, Gen. Syst. 4: 275. 1838.

Convolvulus Meyeri Spreng. Syst. 1: 597. 1825.

Convolvulus cuspidatus Willd.; Spreng. Syst. 1: 597. 1825.

Stem twining, glabrous or sparingly pilose, up to 3 m. long or longer. Leaves ovate to ovate-lanceolate, entire or hastately 3-lobed, 4–12 cm. long, glabrate, thin, the apex acuminate or acute, the base cordate, the upper short-petioled, the lower long-petioled; peduncles 1–10 cm. long, 1–10-flowered; pedicels very short, the cymes contracted, the bracts linear; sepals linear-lanceolate, pilose, acuminate, 2–3 cm. long; corolla blue, violet or purple with a white throat, 2.5–3 cm. long; capsule subglobose, about 8 mm. in diameter; seeds finely pubescent. [*Ipomoea purpurea* of Grisebach, not of Lamarck; *I. coerulea* of Bello, not of Koenig; *I. portoricensis* of House, not of G. Don.]

Thickets and river-banks, at lower elevations, southern and western districts of Porto Rico:—Jamaica; Cuba; Hispaniola; Guatemala to Venezuela.

9. *Ipomoea Pes-caprae* (L.) Roth. Nov. Sp. 109. 1821.

Convolvulus Pes-caprae L. Sp. Pl. 159. 1753.

Convolvulus brasiliensis L. Sp. Pl. 159. 1753.

Convolvulus biloba Forsk. Fl. Aegypt. Arab. 44. 1775.

Convolvulus maritimus Desv. in Lam. Encycl. 3: 556. 1789.

Glabrous, succulent. Stems prostrate, creeping, sometimes 20 m long or more, branching; leaves suborbicular, 6–10 cm. broad, usually notched at the apex, rounded or cordate at the base; petioles as long as the blades or shorter; peduncles stout, 1–several-flowered; pedicels more slender than the peduncles; sepals glabrous, oval or suborbicular, about 1 cm. long, obtuse; corolla purple, 4–5 cm. long, its tube broadly funnel-form, its limb undulately lobed, 5–8 cm. broad; capsules broadly ovoid or globose-ovoid, 1.5 cm. high; seeds pubescent.

Coastal sands, Porto Rico; Mona; Icacos; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Georgia and Florida; Bermuda; West Indies; continental tropical America and Old World tropics. BAY HOPS. BEJUCO DE PLAYA.

10. *Ipomoea stolonifera* (Cyrill.) Poir. in Lam. Encycl. 6: 20. 1804.

Convolvulus littoralis L. Syst. ed. 10, 924. 1759. Not *Ipomoea littoralis* Blume. 1826.

Convolvulus arenarius Vahl, Symb. 1: 18. 1790.

- Convolvulus stoloniferus* Cyrill. Pl. Rar. Neap. 1: 14. 1788.
Convolvulus acetosaefolius Vahl, Eclog. 1: 18. 1796.
Ipomoea carnosae R. Br. Prodr. 485. 1810.
Ipomoea acetosaefolia R. & S. Syst. 4: 247. 1819.
Batatas littoralis Choisy, Conv. Rar. 124. 1838.
Batatas acetosaefolius Choisy, in DC. Prodr. 9: 338. 1845.
Ipomoea littoralis Boiss. Fl. Orient. 4: 112. 1879.

Stem slender, buried in sand, sending up branches which rise 0.5–2 dm. above the surface, glabrous and fleshy, sometimes twining on shrubs. Leaves ovate to ovate-oblong, or broader, long-petioled, fleshy, glabrous, 3–7 cm. long, entire or variously lobed, narrowed at the base or the later ones rounded or cordate; flowers few or solitary; peduncles mostly shorter than the leaves; sepals oval or oblong, 10–15 mm. long, mucronate; corolla white, funnelform-campanulate, 4–5 cm. long; capsules globose, 1–1.5 cm. long; seeds smooth.

Coastal sands, Porto Rico; Culebra; Vieques; St. Croix:—South Carolina to Florida; West Indies; continental tropical America; Old World tropics. BEJUCO DE COSTA.

11. *Ipomoea Horsfalliae* W. Hooker, Bot. Mag. 61: pl. 3315. 1834.

Ipomoea pendula Choisy in DC. Prodr. 9: 387. 1845.

Glabrous; stem high-climbing, up to 8 m. long or longer. Leaves pedately 5–7-foliolate, or some of the upper ones deeply 5-cleft; leaflets obovate, oblong or lanceolate, thin, sessile, 4–11 cm. long, entire, the apex acuminate, the base narrowed; peduncles stout, 2–12 cm. long, few-many-flowered; pedicels 1–3 cm. long; sepals red, ovate-oblong, obtuse, the larger ones 10–12 mm. long; corolla narrowly campanulate-funnelform, about 6 cm. long; capsule ovoid, about 1.5 cm. long; seeds long-hairy.

Woodlands and forests, Porto Rico, ascending to higher elevations. Endemic. Planted for ornament in Porto Rico and the Virgin Islands and elsewhere in tropical regions, elegant when in bloom.

12. *Ipomoea quinquefolia* L. Sp. Pl. 162. 1753.

- Convolvulus quinquefolius* L. Syst. ed. 10, 923. 1759.
Batatas quinquefolia Choisy, Conv. Rar. 127. 1838.
Merremia quinquefolia Hall. f. Bot. Jahrb. 16: 552. 1893.

Stem very slender, 1–2 m. long, twining or trailing, glabrous, or sparingly long-pilose. Leaves 5-foliolate, or some of them 3–4-foliolate, mostly slender-petioled, the petioles glabrous or pilose; leaflets oblong to lanceolate or linear-lanceolate, sessile, 2–6 cm. long, serrate, the apex acute or acuminate, the base narrowed; inflorescence peduncled, glabrous or glandular, few-flowered; pedicels nearly filiform; sepals ovate-oblong, obtuse, the lower ones 6–8 mm. long; corolla white or pale yellow, 1.5–2 cm. long; capsule subglobose, 8–10 mm. in diameter; seeds puberulent.

Banks and thickets at low elevations, Porto Rico; St. Croix; St. Thomas; Tortola:—Jamaica; Cuba; Hispaniola; Guadeloupe; Martinique; Grenada; Mexico and continental tropical America. BATATILLA BLANCA.

13. *Ipomoea heptaphylla* (Rottl. & Willd.) Voight, Hort. Sub. Calc. 360. 1845.

- Convolvulus heptaphyllus* Rottl. & Willd. Neue. Schrift. Ges. Nat. Fr. 4: 196. 1803.
Ipomoea radicans Bert.; Choisy in DC. Prodr. 9: 389. 1845.
Ipomoea pulchella Griseb. Fl. Br. W. I. 470. 1861. Not Roth. 1821.

Slender, glabrous, 1–2 m. long or longer, twining or trailing. Leaves pedately 5-foliolate, long-petioled; leaflets oblong, lanceolate or linear-lanceolate, entire, sessile, 1–4.5 cm. long, the apex acute, acuminate or obtuse, the base narrowed; peduncles filiform, about as long as the petioles or longer, 1-flowered;

bracts about 1 mm. long; pedicel 8–10 mm. long; sepals ovate, obtuse, 5–7 mm. long; corolla violet, 2.5–3 cm. long; capsule ovoid, about 8 mm. long; seeds finely pubescent.

River banks and lake shores, southwestern districts of Porto Rico; St. Thomas (according to Urban):—Cuba; Jamaica; Antigua; Guadeloupe; Curaçao; continental tropical America and Old World tropics.

14. *Ipomoea carnea* Jacq. Enum. 13. 1760.

Stem stout, climbing, velvety-puberulent at least when young. Leaves thin, long-petioled, broadly ovate or suborbicular, 5–15 cm. long, entire, puberulent on both sides, the apex short-acuminate, the base cordate or subcordate; peduncles stout, puberulent, about as long as the petioles or shorter, several-flowered; sepals suborbicular, about 5 mm. long, puberulent; corolla violet-pink or white, 6–7 cm. long, puberulent; capsule ovoid, about 1.5 cm. long; seeds long-woolly.

Mountain woodlands, San Ildefonso, near Coamo, determined by Urban from barren specimens collected by Sintenis; St. Croix (according to West):—Jamaica; St. Vincent; Margarita; Aruba; Nicaragua to Venezuela.

15. *Ipomoea calantha* Griseb. Cat. Pl. Cub. 202. 1866.

Stem rather slender, twining, glabrous, but muricate on the angles below. Leaves membranous, broadly ovate, entire, slender-petioled, 6–10 cm. long, glabrous above, more or less pubescent beneath, the apex acute or acuminate, the base cordate; peduncles rather stout, 1–few-flowered, about as long as the petioles or shorter; pedicels stout, short; sepals oval or ovate-oval, rounded or obtuse, about equal, 10–13 mm. long, puberulent; corolla rose or white, about 9 cm. long, glabrous or nearly so; capsule subglobose, about 12 mm. in diameter; seeds long-woolly. [*I. carnea* of Bello, not of Jacquin.]

Woods and thickets, southwestern dry districts of Porto Rico at low elevations:—Cuba; Curaçao; Colombia; Venezuela.

16. *Ipomoea angustifolia* Jacq. Coll. 2: 367. 1788.

Convolvulus filicaulis Vahl, Symb. 3: 24. 1794.

Ipomoea filicaulis Willd. Sp. Pl. 1: 848. 1798.

Merremia angustifolia Hall. f. Bot. Jahrb. 16: 552. 1893.

Glabrous; stems slender, usually several from a deep root, prostrate, 0.2–2 m. in length. Leaves narrowly linear to linear-lanceolate, almost sessile, 2–5 cm. long, 0.5–6 mm. wide, subhastate and dentate with a few short acuminate or acute teeth or lobes at the base, the apex gradually acuminate; peduncles filiform, about as long as the leaves or shorter, 1–few-flowered, pedicels filiform; bracts linear-lanceolate 1.5–3 mm. long; sepals oblong, aristulate, about 3 mm. long; corolla white, 1–1.5 cm. long; capsule globose, about 6 mm. in diameter; seeds smooth. [*Ipomoea sericantha* of Stahl, not of Grisebach.]

In sand, northern coastal plain of Porto Rico:—southern and tropical Africa. Introduced into Georgia. The plant appears to be native in Porto Rico, and, if so, is a very interesting illustration of a species in common between tropical Africa and America. It was first described by Jacquin from specimens collected in Guinea, not Guiana as stated by House.

17. *Ipomoea tenuissima* Choisy in DC. Prodr. 9: 376. 1845.

Glabrous or nearly so; stem very slender, twining, 3–10 dm. long. Leaves lanceolate, slender-petioled, 2–6.5 cm. long, entire, sagittate, the basal lobes lanceolate to ovate, the apex obtuse or acute, mucronulate; peduncles 1-flowered, rarely 2-flowered, shorter than the leaves or longer; bracts linear, about 2 mm. long, deciduous; pedicel 2–6 mm. long; sepals oblong-lanceolate, long-ciliate,

aristulate, 6–7 mm. long; corolla pink to purple, about 2.5 cm. long; capsule subglobose, about as long as the sepals; seeds smooth.

Sandy coconut grove, Joyuda, Porto Rico, April, 1913:—Florida; Cuba; Hispaniola.

18. *Ipomoea triloba* L. Sp. Pl. 161. 1753.

Ipomoea eustachiana Jacq. Obs. 2: 12. 1767.

Ipomoea parviflora Vahl, Symb. 3: 34. 1794.

Convolvulus Sloanei Spreng. Syst. 1: 593. 1825.

Ipomoea triloba eustachiana Eggers, Bull. U. S. Nat. Mus. 13: 71. 1879.

Ipomoea triloba quinqueloba Kuntze, Rev. Gen. Pl. 446. 1891.

Somewhat pubescent or glabrate; stem herbaceous, slender, 5–10 dm. long, usually trailing. Leaves usually very deeply 3–5-lobed, sometimes entire, ovate, 2–10 cm. long, acute or acuminate at the apex, cordate at the base, the petioles slender; peduncles mostly longer than the petioles, 1–few-flowered; pedicels 1–2 cm. long, thickening in fruit; sepals oblong, acute or mucronate, pilose, 5–6 mm. long; corolla red or purple, funnellform-campanulate, about 1.5 cm. broad; capsule subglobose, pilose, 2-celled, about 7 mm. in diameter; seeds glabrous.

Thickets, waste and cultivated grounds at lower elevations, Porto Rico; Mona; Vieques; Icacos; St. Croix; St. Thomas; St. Jan:—Florida; West Indies; continental tropical America; naturalized in tropical regions of the Old World. BEJUQUILLO DE PUERCO.

19. *Ipomoea Krugii* Urban, Symb. Ant. 5: 472. 1908.

Glabrous, twining. Leaves ovate, long-petioled, 5–9 cm. long, entire or 2-lobed below the apex, long-acuminate, the base cordate; peduncles 3.5–5 cm. long, 2- or 3-flowered; sepals 12–13 mm. long, oblong to elliptic-acuminate, equal; corolla about 3.5 cm. long or shorter, white, the tube subcylindric.

Near Mayaguez, collected only by Krug, and known to us from description only.

20. *Ipomoea tiliacea* (Willd.) Choisy, in DC. Prodr. 9: 375. 1845.

Convolvulus tiliaceus Willd. Enum. 1: 203. 1809.

Convolvulus fastigiatus Roxb. Hort. Beng. 13. 1814.

Ipomoea cymosa G. F. W. Meyer, Prim. Fl. Esseq. 99. 1818.

Ipomoea fastigiata Sweet, Hort. Brit. 288. 1826.

Ipomoea Batatas fastigiata Kuntze, Rev. Gen. Pl. 442. 1891.

Ipomoea gracilis House, Ann. N. Y. Acad. Sci. 18: 248. 1908. Not R. Br. 1810.

Glabrous or sparingly pubescent, twining up to 2 m. long or longer, the root sometimes tuberiferous. Leaves ovate, 5–8 cm. long, membranous, acute at the apex, cordate at the base, the slender petioles sometimes half as long as the blades; peduncles about as long as the petioles or longer, few-several-flowered; pedicels short; sepals oblong, mucronate or aristulate, unequal, the larger about 8 mm. long; corolla purple, pink or rarely white, usually with a dark eye, 5–6 cm. long; capsule 2-celled, subglobose, 8–10 mm. in diameter; seeds glabrous.

Banks and thickets at lower elevations, Porto Rico; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Florida; West Indies; continental tropical America. The vines are used for hog-food. This species is supposed to have yielded the following one through aboriginal selection and cultivation. BEJUCO DE PUERCO.

21. *Ipomoea Batatas* (L.) Lam. Encycl. 6: 14. 1804.

Convolvulus Batatas L. Sp. Pl. 154. 1753.

Batatus edulis Choisy, Mem. Soc. Phys. Genève 6: 435. 1845.

Ipomoea pandurata cuspidata Kuntze, Rev. Gen. Pl. 445. 1891.

Rootstocks large, fleshy, a well-known vegetable; stems glabrous or nearly so, trailing, 1 m. long or longer. Leaves various, ovate to suborbicular, entire,

dentate or lobed, acuminate at the apex, cordate at the base, 5–15 cm. long; peduncles as long as the petioles or shorter, few-flowered; sepals oblong, acute, cuspidate, somewhat unequal, 7–10 mm. long; corolla pale purple or nearly white, about 5 cm. long; ovary and capsule 2-celled; seeds glabrous.

Persistent or spontaneous after cultivation for its valuable edible roots, Porto Rico and the Virgin Islands;—widely cultivated for food in temperate and tropical regions, its original home unknown; not known anywhere in the wild state. Mr. J. B. Thompson, Director of the St. Croix Agricultural Experiment Station, produced, through repeated hybridization, a very wonderful series of more than 250 kinds of sweet potatoes, during several years prior to 1924; the great plantation of these, established by him, was studied with great interest and appreciation early in that year; his work has made possible the selection of improved kinds of this, the most important root-crop of the tropics. **BATATA.** **SWEET POTATO.**

22. *Ipomoea tricolor* Cav. Icon. 3: 5. 1794.

Twining, glabrous, up to 4 m. long or longer. Leaves orbicular-ovate, thin, long-petioled, entire or repand, 3–12 cm. broad, the apex acuminate or obtuse, the base cordate; peduncles stout, hollow, 2–5 cm. long, usually several-flowered; pedicels rather stout, 0.5–4 cm. long; sepals oblong-lanceolate, obtuse, scarious-margined, 6–7 mm. long; corolla blue, fading purple, 6–8 cm. broad; capsule ovoid-ellipsoid, about 1.5 cm. long finely nerved; seeds oblong, glabrous. [*I. violacea* of Grisebach, of Eggers, of Millspaugh and of House, not of Linnaeus; ? *Pharbitis violacea* of Krebs.]

Collected by Krug at Mayaguez; St. Croix; St. Thomas; St. Jan; planted for ornament:—Jamaica; Cuba; St. Martin; Saba; Antigua; Guadeloupe; continental tropical America. **GRANNY-VINE.**

Ipomoea eriocarpa R. Br., East Indian, found as a waif at Rio Piedras by Stevenson in 1914, is a slender, somewhat pubescent vine with ovate-lanceolate cordate leaves and small flowers in axillary short-stalked cymes. [*I. sessiliflora* Roth.]

Ipomoea Learii Paxton, LEAR'S MORNING-GLORY, planted for ornament in the Virgin Islands, is a twining vine, up to 13 m. in length, with large cordate, entire or 3-lobed leaves, the lilac or purple flowers 10–12 cm. broad; it is supposed to be of South American origin.

Ipomoea Pes-tigridis L. [*Convolvulus Pes-tigridis* L.], East Indian, was recorded by Schlechtendal as formerly existing on St. Thomas, and was found at Rio Piedras, Porto Rico, by Stevenson in 1914, apparently not persistent. It is a long hirsute vine with deeply palmately lobed leaves, the flowers capitate in long-peduncled bracted heads.

Ipomoea asarifolia (Desv.) R. & S. [*Convolvulus asarifolius* Desv.] is recorded by Grisebach from the "Danish Islands" but is otherwise unknown within the limits of this Flora. The record is probably erroneous. Mr. N. E. Brown informs us that no specimen of it from the Virgin Islands is preserved in the Kew Herbarium.

Ipomoea dumetorum Willd. and *I. incarnata* Choisy, species of northern South America, were listed by Krebs from St. Thomas.

Ipomoea sagittata Lam., of the southeastern United States, Bermuda, Bahamas and Cuba, was also recorded by Krebs as found in St. Thomas, presumably in error.

Ipomoea leucantha Jacq., a South American species, was listed by Eggers as found on St. Croix and St. Thomas prior to 1876, presumably an error in determination.

Ipomoea quinquepartita (Vahl) R. & S. [*Convolvulus quinquepartitus* Vahl; *C. ovalifolius* West, not Vahl], recorded from St. Croix, is not identified.

8. **OPERCULINA** Manso, Enum. Subst. Bras. 14. 1836.

Perennial twining vines, the leaves and flowers mostly large, the flowers clustered or solitary. Sepals broad, much enlarged in fruit. Corolla funnelform or campanulate. Anthers large. Ovary 2-celled; stigmas 2, globose. Capsule operculate. Seeds large, black, glabrous. [Latin, referring to the operculate capsule.] About 15 species, of tropical regions. Type species: *Operculina Convolvulus* Manso.

Pubescent; leaves entire, cordate; corolla white.
Glabrous; leaves deeply palmately lobed; corolla yellow.

1. *O. triquetra*.
2. *O. tuberosa*.

1. *Operculina triquetra* (Vahl) Hall. f. Bot. Jahrb. 18: 120. 1894.

Convolvulus triquetra Vahl, Symb. 3: 30. 1794.

Ipomoea triquetra R. & S. Syst. 4: 231. 1819.

Densely pubescent nearly all over; stem sharply 3-angled, climbing. Leaves ovate or ovate-orbicular, 5–8 cm. long, slender-petioled, the apex acute or short-acuminate, the base cordate or subcordate; peduncles 1–few-flowered, longer than the petioles, loosely pubescent, 5 cm. long or shorter; bracts ovate-lanceolate, pubescent, deciduous, about 15 mm. long; sepals ovate, obtuse, the outer ones 1.5–2 cm. long, pubescent, the inner smaller, glabrous; corolla white, about 3 cm. long.

Thickets, St. Croix; St. Thomas. Endemic.

2. *Operculina tuberosa* (L.) Meissn. in Mart. Fl. Bras. 7: 212. 1869.

Ipomoea tuberosa L. Sp. Pl. 160. 1753.

Glabrous; stem high-climbing, rather stout. Leaves long-petioled, deeply palmately 5–7-lobed, 8–20 cm. broad, the lobes lanceolate or elliptic-lanceolate, acuminate or acute; peduncles stout, 1–several-flowered, commonly as long as the petioles or longer; pedicels 1–4 cm. long, upwardly thickened in fruit; flowering sepals ovate, obtuse, about 2 cm. long, in fruit becoming 4–6 cm. long; corolla yellow, about 5 cm. long; capsule globose, nearly 3 cm. in diameter; seeds about 2 cm. long, angled.

Forests, St. Croix (according to Eggers); St. Thomas:—Florida; Jamaica; Cuba; Hispaniola; Guadeloupe; continental tropical America; Old World tropics. Occasionally planted for ornament. BATATILLA VENTRUDA.

Operculina ventricosa (Bert.) Peter, native of the Lesser Antilles, a twining glabrous vine, with large cordate, entire leaves, and large, white or cream-colored flowers, is planted for ornament in Porto Rico and Virgin Islands gardens. [*Convolvulus ventricosus* Bert.; *Ipomoea ventricosa* Choisy; *Argyrea tiliaefolia* of Stahl, not of Wight.]

9. **RIVEA** Choisy, Mem. Soc. Phys. Genève 6: 407. 1833.

Twining woody vines, mostly with broad leaves and large axillary flowers. Sepals enlarged in fruit. Corolla funnelform to campanulate. Ovary 4-celled; ovule 1 in each cavity. Style 1; stigma globose. Fruit baccate, indehiscent. [Commemorates Aug. de la Rive, Swiss physician.] A few species, of tropical distribution, the following typical.

1. *Rivea campanulata* (L.) House, Muhlenbergia 5: 72. 1909.

Ipomoea campanulata L. Sp. Pl. 160. 1753.

Convolvulus tiliaefolius Desv. in Lam. Encycl. 3: 544. 1789.

Rivea tiliaefolia Choisy, Mem. Soc. Phys. Genève 6: 407. 1833.

Argyreia tiliaefolia Wight, Icones 4²: 12. 1850.

Stictocardia tiliaefolia Hall. f. Bot. Jahrb. 18: 159. 1893.

Stem rather stout, puberulent when young, 2–4 m. long or longer. Leaves long-petioled, broadly ovate or ovate-orbicular, thin, 8–15 cm. long, entire or nearly so, puberulent beneath, the apex acute, short-acuminate or obtuse, the base cordate; peduncles short, stout, 1–few-flowered; sepals ovate, rounded, puberulent, 1–1.5 cm. long in flower, about 3 cm. long in fruit; corolla rose, 7–8 cm. long; berry subglobose, 2–2.5 cm. in diameter; seeds puberulent, 8–10 mm. long.

Thickets along and near the northern and western coast of Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan; Virgin Gorda:—Florida; West Indies (except Bahamas); continental tropical America and Old World tropics.

10. *TURBINA* Raf. Fl. Tell. 4: 81. 1838.

Vines with cordate leaves, and axillary peduncled clusters of large or middle-sized flowers. Sepals ovate to lanceolate, spreading and little enlarged in fruit. Corolla campanulate or funnelform. Ovary 2-celled or 4-celled; stigmas 2. Fruit dry, woody, indehiscent, subglobose or ovoid, 1-celled, mostly 1-seeded, the seeds smooth. [Latin, from the supposed top-shaped fruit.] About 20 species, natives of tropical regions, the following typical.

1. *Turbina corymbosa* (L.) Raf. Fl. Tell. 4: 81. 1838.

Convolvulus corymbosus L. Syst. ed. 10, 923. 1759.

Convolvulus domingensis Desv. in Lam. Encycl. 3: 554. 1791.

Convolvulus sidaefolius H.B.K. Nov. Gen. 3: 99. 1818.

Ipomoea sidaefolia Choisy, Mem. Soc. Phys. Genève, 6: 459. 1833.

Ipomoea Burmannii Choisy in DC. Prodr. 9: 350. 1845.

Rivea corymbosa Hall. f. Bot. Jahrb. 18: 157. 1893.

Ipomoea antillana Millsp. Field Mus. Bot. 2: 84. 1900.

High-climbing or trailing, glabrous. Leaves slender-petioled, ovate, entire, 4–10 cm. long, acute or acuminate at the apex, cordate at the base; peduncles axillary, as long as the leaves or longer, corymbosely or paniculately several-many-flowered, the pedicels slender; sepals oblong, persistent, the 3 inner ones 8–12 mm. long, nearly twice as long as the two outer; corolla white, 2.5–3 cm. long; fruit ovoid, acute, about half as long as the longer sepals, 1-seeded.

Thickets at lower elevations, western districts of Porto Rico:—Bahamas; Jamaica; Cuba; Hispaniola; Guadeloupe; Tobago; continental tropical America north to Mexico. CHRISTMAS VINE. AGUINALDO.

Porana paniculata Roxb., WHITE CORALITA, CHRISTMAS VINE, East Indian, grown for ornament in Porto Rico and the Virgin Islands, is a whitish-pubescent twining vine, sometimes 10 m. long, with ovate cordate leaves 7–15 cm. long and very numerous, small white-panicked flowers only about 3 mm. long, the fruit a very small globose capsule. It is widely grown for ornament in tropical regions.

Argyreia speciosa (L. f.) Sweet, East Indian, grown for ornament in Porto Rico, as in many other West Indian islands, is a high-climbing-vine, the stout stems white-tomentose, the long-petioled, suborbicular leaves 1–3 dm. broad, silvery-tomentose beneath, green and glabrous above, the long peduncles um-

bellately several-flowered, the bracted flowers with a rose-colored corolla 5–6 cm. long, the yellow fruit baccate. [*Convolvulus speciosus* L. f.; *Argyreia bracteata* Choisy.]

Convolvulus matutinus West, and *Convolvulus venenatus* West, described in 1793 as from St. Croix, were not identified by subsequent botanists.

Family 2. CUSCUTACEAE Dumort.

DODDER FAMILY.

White, red or yellow slender or filiform parasites, dextrorsely twining, the leaves reduced to minute alternate scales. Calyx inferior, 5-lobed or 5-parted (rarely 4-lobed or 4-parted), or of 5 distinct sepals. Corolla 5-lobed (rarely 4-lobed), the tube bearing as many fimbriate or crenulate scales as there are lobes and alternate with them, or these sometimes obsolete. Stamens as many as the corolla-lobes, inserted in the throat or sinuses above the scales; anthers short, ovate or oval, obtuse, 2-celled, the sacs longitudinally dehiscent. Ovary 2-celled; ovules 2 in each cavity; styles 2, terminal, separate, or rarely united below; stigmas linear or capitate. Capsule globose or ovoid, circumscissile, irregularly bursting or indehiscent, 3–4-seeded. Seeds glabrous; embryo linear, terete, curved or spiral, its apex bearing 1–4 minute alternate scales; endosperm fleshy; cotyledons none. Only one genus.

1. CUSCUTA [Tourn.] L. Sp. Pl. 124. 1753.

Characters of the family. The filiform twining stems are parasitic on herbs and shrubs by numerous minute suckers. The seeds germinate in the soil and the plantlet attaches itself to its host, its root and lower portion soon perishing. The subsequent nutrition of the parasite is apparently wholly through its suckers. Indications of a small amount of green coloring matter, possibly chlorophyll, have been observed in some species. [Name from the Arabic] About 100 species or more, of wide distribution. Type species: *Cuscuta europaea* L. Known as BEJUCO DE MONA, FIDEOS and DODDER.

Capsule circumscissile.

Corolla-lobes obtuse.

Corolla-lobes acute or acuminate.

Capsule indehiscent.

Flowers scarcely fleshy.

Corolla-lobes obtuse.

Corolla-lobes acute or acuminate, the tips inflexed.

Flowers fleshy; corolla-lobes acuminate.

1. *C. americana*.

2. *C. umbellata*.

3. *C. glandulosa*.

4. *C. pentagona*.

5. *C. indecora*.

1. *Cuscuta americana* L. Sp. Pl. 124. 1753.

Cuscuta americana congesta Progel, in Mart. Fl. Bras. 7: 376. 1871.

Cuscuta americana spectabilis Progel, loc. cit. 377. 1871.

Stems slender, sometimes high-climbing on shrubs. Flowers cymose or subracemose, 2.5–4 mm. long, 5-parted; calyx tubular, its ovate-orbicular lobes obtuse; corolla cylindric, its tube about as long as the calyx, its ovate obtuse lobes erect or slightly spreading; scales triangular or oblong-triangular, fringed, shorter than the corolla-tube; filaments shorter than the anthers; capsule globose-ovoid, circumscissile, capped by the withering corolla; seeds usually 1 or 2, about 1.5 mm. long.

On herbs and shrubs at lower elevations, Porto Rico; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—West Indies; Mexico.

2. *Cuscuta umbellata* H.B.K. Nov. Gen. 3: 121. 1818.

Stems very slender. Flowers 3–6 mm. long, 5-parted, pedicelled in dense compound cymes; calyx turbinate, its triangular-ovate lobes acute or acuminate; corolla campanulate; corolla-lobes as long as the tube or longer, lanceolate or oblong-lanceolate, reflexed; scales obovate or spatulate, fringed; filaments as long as the anthers or somewhat longer; capsule depressed-globose, circumscissile, surrounded by the withering corolla; seeds about 1 mm. long.

On herbaceous plants, southwestern dry districts of Porto Rico at low elevations; Muertos:—Jamaica; Cuba; southern and southwestern United States; Mexico.

3. *Cuscuta glandulosa* (Engelm.) Small, Fl. SE. U. S. 969. 1903.

Cuscuta obtusiflora glandulosa Engelm. Trans. Acad. St. Louis 1: 492. 1859.

Stems slender. Flowers 5-parted, not fleshy, about 2 mm. long, sessile or subsessile in dense globose clusters; calyx-lobes ovate, obtuse; corolla campanulate, its ovate obtuse lobes erect, spreading, or becoming reflexed, shorter than the tube; scales fimbriate, about as long as the corolla-tube; filaments longer than the anthers; capsule indehiscent, depressed-globose, the withering corolla remaining at its base; seeds 2–4.

Sierra de Naguabo, Porto Rico, collected only by Britton and Cowell, determined by Prof. Youncker:—Cuba; southern United States; Mexico.

4. *Cuscuta pentagona* Engelm. Am. Journ. Sci. 43: 340. 1842.

Cuscuta arvensis Beyr.; Hook. Fl. Bor. Am. 2: 77. Hyponym. 1834.

Cuscuta pentagona calycina Engelm. Am. Journ. Sci. 45: 76. 1845.

Stems nearly filiform, the 5-parted flowers nearly sessile in small globose clusters. Calyx-lobes obtuse; corolla nearly campanulate, the lobes acute or acuminate, about as long as the tube, their tips inflexed; scales large, ovate, densely fringed all around with short irregular processes; filaments longer than the anthers; capsule depressed-globose, indehiscent, the withering corolla remaining at its base; seeds about 4, about 1 mm. long.

Near Manatí and Arecibo, Porto Rico:—Bahamas; Jamaica; Cuba; Martinique; Canada and the United States; northern Mexico.

5. *Cuscuta indecora* Choisy, Mem. Soc. Phys. Genève 9: 278. 1841.

Cuscuta decora Engelm. Trans. Acad. St. Louis 1: 501. 1859.

Cuscuta indecora neuropetala Hitchc. Contr. U. S. Nat. Herb. 3: 549. 1896.

Cuscuta portoricensis Urban, Symb. Ant. 4: 502. 1910.

Stems rather slender. Flowers 3–5 mm. long, fleshy, pedicelled in compact or rather loose clusters; calyx-lobes triangular or lanceolate, acute or acutish; corolla campanulate; its triangular acute lobes inflexed; scales ovate to nearly spatulate, deeply fringed, as long as the corolla-tube or longer; filaments about as long as the anthers; capsule globose, pointed, indehiscent, enclosed by the withering corolla; seeds 2–4, about 1.7 mm. long.

On *Lippia reptans*, shore of Lake Guanica, Porto Rico:—Jamaica; Cuba; Hispaniola; United States; northern Mexico; Venezuela.

Cuscuta corymbosa R. & P., a species of Mexico and Central America and *C. racemosa* Choisy, Brazilian, were recorded by Krebs from St. Thomas, doubtless in error.

Family 3. **HYDROPHYLLACEAE** Lindl.

WATER-LEAF FAMILY.

Herbs, mostly hirsute, pubescent or scabrous, with alternate or basal, rarely opposite leaves, and perfect regular 5-parted flowers, in scorpioid

cymes, spikes or racemes, or rarely solitary. Calyx inferior, deeply cleft or divided. Corolla gamopetalous. Stamens 5, inserted on the corolla, and alternate with its lobes; filaments filiform; anthers mostly versatile, 2-celled, the sacs longitudinally dehiscent. Disk annular, or none. Ovary superior, 2-celled, or 1-celled with 2 placentae; styles 2, separate, or partly united; stigmas small, terminal; ovules anatropous or amphitropous. Capsule 1-2-celled, mostly loculicidally 2-valved. Seeds usually pitted, rugose or reticulated; endosperm fleshy or cartilaginous; embryo small; cotyledons half-terete or plano-convex. About 17 genera and 175 species, mostly natives of western North America.

1. **MARILAUNIDIUM** Kuntze, Rev. Gen. Pl. 434. 1891.

Branching pubescent herbs, with alternate entire leaves, the flowers solitary in the axils. Calyx 5-cleft. Corolla funnelform or salverform, 5-lobed, the lobes imbricated in the bud. Stamens mostly included, borne on the corolla-tube. Ovary 1-celled, or incompletely 2-celled; ovules numerous. Fruit a 2-valved capsule. [In honor of Dr. Anton Kerner, Knight of Marilaun, 1831-1898.] About 20 species, natives of America, the following typical.

1. **Marilaunidium jamaicense** (L.) Kuntze, Rev. Gen. Pl. 434. 1891.

Nama jamaicense L. Syst. ed. 10, 950. 1759.

Hydrolea jamaicensis Raensch. Nom. ed. 3, 76. 1797.

Annual, much branched, the branches prostrate, 0.7-4 dm. long. Leaves thin, spatulate or obovate, 1-5 cm. long, obtuse or apiculate, narrowed to a sessile, somewhat decurrent base; peduncles 6 mm. long or less; calyx-segments hirsute, linear, 6-8 mm. long; corolla white or purplish, about as long as the calyx, its lobes broad; capsule oblong, a little longer than the calyx.

Moist or dry shaded situations, southern dry districts of Porto Rico; St. Croix; St. Thomas;—Florida; Texas; Bermuda; West Indies; Mexico to Venezuela. JAMAICA WEED.

Phlox Drummondii Hook., Texan, of the related family **Polemoniaceae**, grown for ornament in Porto Rican and Virgin Island gardens, is a low villous and viscid annual, with alternate oblong to lanceolate leaves 1.5-4 cm. long, and large corymbose flowers, the salverform corolla white, red or purple.

Phlox ovata L., North American, listed by Krebs as formerly grown in St. Thomas, where it may have been planted, is an erect glabrous perennial, with opposite, oblong or lanceolate leaves and purple flowers.

Family 4. **EHRETIACEAE** Schrad.

EHRETIA FAMILY.

Shrubs, trees or rarely herbs, with alternate estipulate simple entire or dentate leaves, and perfect regular flowers in heads, spikes, cymes or panicles. Calyx 2-5-lobed, persistent. Corolla gamopetalous, mostly 5-lobed, the lobes spreading. Stamens mostly 5, borne on the base of the corolla-tube, the anthers introrse. Ovary superior, 1-4-celled; styles 2, distinct or rarely united, or 4, united in pairs; ovules 1 or 2 in each cavity of the ovary. Fruit a drupe. Seeds 1-4. About 20 genera, including some 350 species, of tropical and warm-temperate regions.

- A. Styles each 2-cleft, distinct, or united below.
 Calyx 10-12-ribbed.
 Calyx 3-5-toothed; corolla withering-persistent.
 Calyx circumscissile; corolla deciduous.
 Calyx not ribbed.
 Corolla-tube exceeding the calyx, which becomes fleshy or accrescent in fruit.
 Corolla-tube little if at all exceeding the herbaceous calyx.
 Flowers corymbose-cymose; trees.
 Flowers spicate, glomerate or capitate; mostly shrubs.
- B. Styles simple, united below or wholly connate.
 Corolla salverform; unarmed trees or shrubs.
 Corolla rotate; often spiny shrubs or small trees.
1. *Cerdana*.
 2. *Calyptracordia*.
 3. *Sebesten*.
 4. *Cordia*.
 5. *Varronia*.
 6. *Bourreria*.
 7. *Rochefortia*.

1. *CERDANA* R. & P. Fl. Per. 2: 47. 1799.

Trees, with alternate entire leaves and rather large flowers in terminal panicles, often glomerate at the ends of the panicle-branches. Calyx obconic or subcylindric, 10-ribbed, 3-5-toothed. Corolla salverform, marcescent, its tube about as long as the calyx, its usually 5 lobes contorted, often as long as the tube. Stamens as many as the corolla-lobes. Styles 2-cleft. Fruit described as oblong and 1-celled. [Commemorates Francisco Cerdá y Rico.] A few species, of tropical America, the following typical.

1. *Cerdana alliodora* R. & P. Fl. Per. 2: 47. 1799.

Cordia Gerascanthus Jacq. Sel. Amer. 43. 1763. Not L. 1759.
Cordia alliodora Cham. Linnaea 8: 121. 1833.

A tree, 8-20 m. high, the twigs, inflorescence and calyx more or less densely stellate-pubescent. Leaves oblong to elliptic, oblong-lanceolate or elliptic-obovate, subchartaceous, 7-15 cm. long, or the upper smaller, the apex acute or acuminate, the base mostly narrowed, the under surface stellate-pubescent, the petioles about 2 cm. long or shorter; panicles large, sometimes 3 dm. broad, many-flowered; flowers sessile, in glomerules; calyx 4-7 mm. long, stellate-tomentulose, strongly ribbed; corolla white, fading brown, its lobes oblong-spathulate, about as long as the calyx. [*Cordia gerascanthoides* of Cook & Collins, not of Linnaeus; *C. Gerascanthus subcanescens* of Eggers.]

Forests, river valleys and hillsides, Porto Rico, at lower and middle elevations; ascending to about 900 m.; Vieques; St. Thomas; St. Jan; Tortola.—Cuba; Hispaniola; Antigua to Trinidad; continental tropical America. The light brown wood, valued for furniture and for construction, is strong and durable. CAPA. CAPAW. SPANISH ELM.

2. *CALYPTRACORDIA* Britton.

Trees, with broad alternate petioled leaves, the white or yellow flowers in broad terminal panicles. Calyx oblong or campanulate, 10-12-ribbed, membranous, 5-toothed, irregularly circumscissile above, the top calyptriform. Corolla short-funnelform, deciduous, plicate, the limb spreading, 5-toothed. Stamens 5, short. Styles 2, each 2-cleft. Fruit an ovoid drupe, the pit 2-4-celled. [Greek, capped-*Cordia*.] A few species, of tropical America, the following typical.

1. *Calyptracordia alba* (Jacq.) Britton.

Varronia alba Jacq. Enum. 14. 1760.
Cordia alba R. & S. Syst. 4: 466. 1819.
Varronia calyptrata DC. Prodr. 9: 469. 1845.

A shrub, or small tree 3-5 m. high, rarely taller, up to 10 m. high, the branches slender and sometimes vine-like, the twigs, petioles and inflorescence pilose.

Leaves elliptic or ovate-elliptic, 4–12 cm. long, chartaceous, repand-dentate, scabrous above, pilose beneath, at least on the veins, the apex acute or obtuse, the base obtuse or rounded; panicles many-flowered, often broader than long, sometimes 2 dm. broad; flowers very nearly sessile; calyx pubescent, 4–6 mm. long, obovoid in bud; corolla white, or cream-colored, 10–16 mm. broad; drupe white, 10–16 mm. long.

Thickets and river-banks, dry southwestern districts of Porto Rico; St. Croix; St. Thomas:—Jamaica; Cuba; Hispaniola; Antigua to Barbados and Aruba; Mexico to Venezuela. CEREZAS BLANCAS. WHITE MANJACK.

3. **SEBESTEN** Adans. Fam. Pl. 2: 177. 1763.

Trees or shrubs with alternate broad petioled, entire or few-toothed leaves, and large showy flowers in terminal cymes or rarely solitary. Calyx tubular, 3–5-toothed. Corolla salverform, the tube nearly cylindric, the limb spreading, 5–15-lobed. Stamens borne on the corolla-tube, as many as the corolla-lobes; anthers sagittate. Ovary 2–4-celled; styles usually 2, each 2-cleft; stigmas capitate. Drupe ovoid, adnate to the accrescent calyx and enclosed by it, the stone bony. Seeds without endosperm. [Name, Arabic, originally applied to a different tree.] About 12 species of tropical and subtropical America. Type species: *Cordia Sebestena* L.

Calyx strigose; fruit white.
Calyx glabrous; fruit yellow or orange.

1. *S. Sebestena*.
2. *S. Rickseckeri*.

1. **Sebesten Sebestena** (L.) Britton; Small, Fl. Miami 158. 1913.

Cordia Sebestena L. Sp. Pl. 190. 1753.

A tree, reaching a maximum height of about 10 m., with a trunk up to 1.5 dm. in diameter, the scaly bark dark brown, the young twigs brown-hairy. Leaves ovate to oblong-ovate, thick, 8–20 cm. long, repand-dentate or entire, dark green and scabrate above, paler green beneath, acuminate, acute or obtuse at the apex, rounded or subcordate at the base, the petioles 3–5 cm. long; cymes compound, several-many-flowered; pedicels 5–15 mm. long; calyx strigose, cylindric, 1–1.8 cm. long, its lobes short; corolla orange, its tube twice as long as the calyx, its limb 2.5–4 cm. broad; drupe round, 5–8-lobed, white, pointed, 2–4 cm. long, the flesh thin.

Occasional along roadsides; much planted for ornament in Porto Rico and the Virgin Islands, but not known to be native within the range of this flora:—Florida; Bahamas; Cuba; Hispaniola; Guadeloupe to Barbados; Margarita; Curaçao; continental tropical America. The brown wood is hard, with a specific gravity of about 0.7. SAN BARTOLOME. VOMITEL COLORADO. GEIGER TREE. ANACONDA. ALOE-WOOD.

2. **Sebesten Rickseckeri** (Millsp.) Britton.

Cordia Sebestena brachycalyx Urban, Symb. Ant. 1: 389. 1899.

Cordia Rickseckeri Millsp. Field Mus. Bot. 1: 522. 1902.

Sebesten brachycalyx Britton, Bull. Torr. Club 43: 457. 1916.

A tree, 4–8 m. high, similar to the preceding species, the leaves often very scabrous above, elliptic or ovate-elliptic or sometimes oblong; cymes usually many-flowered; calyx cylindric, glabrous or nearly so; corolla orange-red, its limb 2–3 cm. broad; drupe ovoid, yellow or orange.

Coastal thickets, eastern and southern districts of Porto Rico; Culebra; Vieques; St. Thomas; Tortola. Endemic. SAN BARTOLOME.

4. **CORDIA** L. Sp. Pl. 190. 1753.

Trees, sometimes shrubs, with broad alternate leaves, and small or medium-sized, mostly 5-parted flowers in corymbose panicles. Calyx pubescent or

glabrous, not ribbed, its teeth short. Corolla salverform or subrotate, its tube short. Stamens as many as the corolla-lobes. Ovary 4-celled; styles 2-cleft. Fruit a fleshy drupe. [Commemorates Valerin Cordus, 1515–1544, German physician and botanist.] Fifty species, or more, natives of tropical regions. Type species: *Cordia glabra* L.

Leaves glabrous or nearly so.

Leaves chartaceous; petioles slender.

Calyx tomentulose; flowers sessile.

Calyx glabrate; flowers short-pedicelled.

Leaves coriaceous; petioles stout.

Leaves tomentulose-scabrous, 1.5–3 dm. long, short-petioled.

1. *C. glabra*.

2. *C. nitida*.

3. *C. borinquensis*.

4. *C. sulcata*.

1. *Cordia glabra* L. Sp. Pl. 191. 1753.

Cordia Collococca L. Sp. Pl. ed. 2, 274. 1762.

Lithocardium Collococca Kuntze, Rev. Gen. Pl. 438. 1891.

Cordia micrantha Sw. Prodr. 47. 1788.

A tree, 7–15 m. high, with spreading branches, the young twigs and the inflorescence puberulent. Leaves elliptic to obovate or oblong-obovate, chartaceous, often fallen at flowering-time, 7–15 cm. long, entire or slightly repand, glabrous and smooth above, sparingly puberulent beneath, the apex acute or obtuse, the base narrowed or rounded, the slender petioles 1–2.5 cm. long; panicles many-flowered, 4–8 cm. broad; flowers sessile; calyx densely tomentulose, globose in bud, 3–5-toothed, 1.5–2 mm. long; corolla white, 5–6 mm. broad; drupe globose, red, about 8 mm. in diameter. [*Cordia elliptica* of Bello, not of Swartz.]

Hillsides, woodlands, fields and valleys at lower elevations, Porto Rico, in dry or moist districts; Culebra; St. Croix; St. Thomas; St. Jan; Tortola:—West Indies (except Bahamas). Its wood is rather soft and not durable. PALO DE MUÑECA. MANJACK.

2. *Cordia nitida* Vahl; West, Bidr. St. Croix 275. 1793.

A tree, occasionally 20 m. high, usually much smaller, sometimes shrubby, the slender twigs puberulent. Leaves elliptic to obovate-elliptic, chartaceous, 4–14 cm. long, entire, glabrous, shining above, the apex acute or obtuse, the base narrowed, the slender petioles 6–15 mm. long; panicles many-flowered, peduncled, 10 cm. broad or less; pedicels puberulent, 1.5–3 mm. long; calyx nearly glabrous, globose in bud, about 4 mm. long, 3–5-toothed; corolla white, 10–12 mm. broad; drupe globose, bright red, viscid, about 8 mm. in diameter. [*Cordia elliptica* of Sprengel, of Krebs and of Stahl, not of Swartz; (?) *C. laevigata* of Schlechtendal, not of Lamarck.]

Woodlands, hillsides, forests and arroyos, Porto Rico, at lower and middle elevations in dry and moist districts; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Jamaica; Cuba; Hispaniola. The fruit is eaten by wild doves. CEREZA. MUÑECA. WEST INDIAN CHERRY. RED MANJACK.

3. *Cordia borinquensis* Urban, Symb. Ant. 1: 390. 1899.

A tree, with maximum height of about 20 m., usually much smaller, the twigs puberulent, the flowers dioecious. Leaves elliptic, oval or obovate, coriaceous, glabrous, 0.8–2.5 dm. long, entire, strongly reticulate-veined, the apex obtuse, rounded or short-acuminate, the base obtuse, rounded or rarely narrowed, the stout petioles 1–2.5 cm. long; panicles short-peduncled, several-many-flowered, 4–8 cm. broad; flowers subsessile; calyx obovoid in bud, puberulent, about 3.5 mm. long, 5-lobed or that of the staminate flowers somewhat smaller; corolla white, about 8 mm. broad; drupe ovoid to globose, red, about 7 mm. long.

Woods and forests in wet or moist districts, mostly at middle or higher elevations, Porto Rico. Endemic. Its light yellow wood is rather hard and heavy. CAPA CIMARON. MUÑECA.

4. *Cordia sulcata* DC. Prodr. 9: 488. 1845.*Cordia macrophylla* R. & S. Syst. 4: 452. 1819. Not L.

A tree, 6–20 m. high, with furrowed bark, the twigs tomentulose. Leaves ovate to ovate-elliptic, large, 1–3 dm. long, repand or nearly entire, scabrous-tomentulose on both sides, the apex acute or acuminate, the base rounded or subcordate, the stout tomentose petioles 1–1.5 cm. long; panicles peduncled, many-flowered, 8–20 cm. broad; flowers sessile; calyx tomentulose, obovoid in bud, 3–5-toothed, 3–4 mm. long; corolla about 4 mm. broad; drupe subglobose, yellowish-translucent when young, white when mature, 6–8 mm. in diameter.

Hillsides, woodlands and forests, Porto Rico, in wet and moist districts at lower and middle elevations; Vieques; St. Croix (according to West); St. Thomas; St. Jan; Tortola:—Hispaniola; Saba to Trinidad. MORAL. WHITE MANJACK.

Cordia Myxa L. [*Varronia abyssinica* DC.], an Old World species, was listed by Krebs as found in St. Thomas, presumably in error.

5. *VARRONIA* P. Browne, Hist. Jam. 172. 1756.

Shrubs, or small trees, with scabrous or pubescent leaves, the small, usually white flowers variously clustered, mostly sessile in heads, spikes or glomerules. Calyx 4–5-toothed. Corolla salverform or funnelform, the limb 4–5-lobed. Stamens as many as the corolla-lobes, mostly included. Ovary 4-celled. Styles 2-cleft; stigmas small, capitate. Fruit a small, slightly fleshy drupe, often little longer than the calyx-tube and sometimes enclosed by it, containing 4 nutlets or fewer. [In honor of Marcus Varro, a distinguished Roman, born 116 B.C., died 27 B.C.] Seventy species or more, of tropical and subtropical America. Type species: *Lantana corymbosa* L.

A. Flowers spicate.

B. Flowers capitate or glomerate.

1. Heads peduncled.

Heads panicled or subcorymbose.

Heads solitary.

Leaves dentate; calyx-lobes nearly filiform, hirsute.

Leaves entire, repand or denticulate; calyx-teeth ovate to linear.

Calyx-teeth linear-appendaged.

Calyx-teeth ovate.

Leaves bullate.

Leaves not bullate.

2. Inflorescence subsessile, axillary, few-flowered.

1. *V. angustifolia*.2. *V. corymbosa*.3. *V. globosa*.4. *V. bahamensis*.5. *V. lima*.6. *V. rupicola*.7. *V. Bellonis*.1. *Varronia angustifolia* West; Willd. Sp. Pl. 1: 1081. 1797.*Cordia angustifolia* R. & S. Syst. 4: 460. 1819. Not Roxb. 1814.

A shrub, 1–3 m. high, erect, sometimes forming thickets, the twigs, leaves and inflorescence scabrous-puberulent. Leaves linear to linear-lanceolate, chartaceous, low-serrate, 3–7 cm. long, the apex obtuse or acutish, the base narrowed, the petioles 1–5 mm. long; spikes solitary, terminal or lateral, peduncled, slender, 2–4.5 cm. long; flowers numerous, sessile; calyx globose in bud, 2–2.5 mm. long, its lobes ovate; corolla white, 4–5 mm. broad; fruit subglobose, red, about as long as the calyx. [*Cordia cylindrostachya* of Eggers, of Millspaugh and of Urban, not of Ruiz and Pavon.]

Hillsides and thickets, southern and southwestern dry districts of Porto Rico at lower and middle elevations; St. Croix; St. Thomas (according to Eggers):—Cuba; Hispaniola (?).

2. *Varronia corymbosa* (L.) Desv. Journ. Bot. 1: 275. 1808.

Lantana corymbosa L. Sp. Pl. 628. 1753.

Cordia ulmifolia Juss.; Dumont, Bot. Cult. 2: 148. 1802.

Cordia corymbosa G. Don, Gen. Syst. 4: 383. 1838.

A shrub, 1-3 m. high, with slender, sometimes elongated and vine-like branches, the slender twigs densely short-pubescent. Leaves ovate to lanceolate, thin, serrate, 5-12 cm. long, or the upper smaller, dark green, scabrous and with scattered white hairs above, paler or nearly white and tomentulose beneath, the apex acute or acuminate, the base rounded, subcordate or sometimes narrowed, the rather stout pubescent petioles 2-12 mm. long; peduncles axillary, bearing several small globose heads of small white or greenish flowers, or sometimes only one head, often leafy-bracted; calyx subglobose in bud, strigose, 5-toothed, 2-3 mm. long; corolla about 5 mm. wide; fruit red, globose, about as long as the calyx. [*Cordia spinescens* of Sessé & Mogino, not of Linnaeus.]

Thickets and hillsides, Porto Rico, at lower and middle elevations; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Jamaica; Cuba; Hispaniola; Guadeloupe to Trinidad; continental tropical America. Consists of several slightly differing races. BASORA. SARAGUERO. PALO DE PERICO. BLACK SAGE.

3. *Varronia globosa* Jacq. Enum. 14. 1760.

Cordia globosa H.B.K. Nov. Gen. 3: 76. 1818.

Cordia dasycephala H.B.K. Nov. Gen. 3: 76. 1818.

A usually much-branched shrub, 1-3 m. high, the slender twigs hispid. Leaves ovate to ovate-lanceolate or ovate-oblong, 1.5-6 cm. long, rather coarsely serrate, short-petioled, rough and papillose-hispid above, pubescent and strongly veined beneath, acute or bluntish at the apex, narrowed or obtuse at the base; flowers in solitary dense globular peduncled heads, the peduncles mostly shorter than the leaves; calyx hispid, 5-cleft, 6-8 mm. long, its teeth nearly filiform; corolla white, about 6 mm. long; drupe red, about 4 mm. long.

Thickets and hillsides, in the dry southwestern districts of Porto Rico, at low elevations; Mona; recorded from St. Croix and St. Thomas by West, by Schlechtendal and by Eggers, but not seen by us in the Virgin Islands:—Florida; Bahamas; Jamaica; Cayman Islands; St. Barts to Trinidad; Margarita; Curaçao; continental tropical America. CURAÇAO BUSH. CUPILLO.

4. *Varronia bahamensis* (Urban) Millsp. Field Mus. Bot. 2: 310. 1909.

Cordia bahamensis Urban, Symb. Ant. 1: 392. 1900.

A usually much-branched shrub, 1-2 m. high, rarely a small tree 3-4 m. high, the branches slender, the young shoots appressed-setulose. Leaves various, linear-oblong to elliptic or obovate-elliptic, 2-10 cm. long, 0.5-5 cm. wide, acute, obtuse or rounded at the apex, narrowed or obtuse at the base, entire or few-toothed, subcoriaceous, setulose-scabrous above, pilose beneath, at least on the veins, the petioles 4-20 mm. long; peduncles as long as the leaves or shorter; flowers capitate; heads solitary, several-many-flowered; calyx loosely pubescent, 4-5-lobed, the lobes triangular with linear slender tips 2-3 mm. long; corolla white, 4-5-lobed, 3-4 mm. long, its lobes ovate, obtuse; drupe ovoid, obtuse, red to black, about 4 mm. long.

Sandy plain, West End, Anegada:—Bahamas; Cuba.

5. *Varronia lima* Desv. Journ. Bot. 1: 278. 1808.

Cordia lima R. & S. Syst. 4: 465. 1819.

A shrub, 1-2 m. high, the twigs hirsute-scabrous. Leaves ovate or elliptic, rigid, coriaceous, 2-5 cm. long, dentate, very scabrous above and bullate, scabrous-pubescent and reticulate-veined beneath, the apex obtuse, rounded or acute, the base mostly obtuse, the hirsute petioles 3-10 mm. long; glomerules

terminal or also lateral, few-flowered, short-peduncled or subsessile; calyx densely hirsute, globose, about 3 mm. long, 4-5-toothed, the teeth ovate; corolla white, 6-8 mm. broad; fruit globose, about as long as the calyx.

Mountain slopes and serpentine hillsides, northwestern Porto Rico:—Hispaniola.

6. *Varronia rupicola* (Urban) Britton.

Cordia rupicola Urban, Symb. Ant. 1: 392. 1899.

A large shrub, up to 5 m. in height, the twigs setulose-strigose. Leaves ovate to elliptic or oblong-elliptic, chartaceous, 2-9 cm. long, low-crenate or entire, the apex acute or obtuse, the base rounded, obtuse or narrowed, the strigose petioles 2-10 mm. long; heads solitary, terminal or also lateral, densely several-many-flowered, the peduncles 4 cm. long or shorter; calyx obovoid in bud, appressed-pilose, 4-5-lobed, 4-5 mm. long; corolla white, about 7 mm. broad; fruit ovoid, red; about 5 mm. long.

Hillside thickets at low elevations, dry southwestern districts of Porto Rico. Endemic.

7. *Varronia Bellonis* (Urban) Britton.

Cordia Bellonis Urban, Symb. Ant. 1: 393. 1899.

A straggling shrub, about 1 m. high, the very slender twigs appressed-puberulent. Leaves oblong to oblong-lanceolate, or some of them obovate, chartaceous 2-6 cm. long, dentate or denticulate, scabrous above, puberulent beneath, the apex acute, the base acute or obtuse, the petioles 2-7 mm. long; inflorescence axillary, few-flowered, nearly sessile, subglomerate; calyx in bud globose-obovoid, about 2 mm. long, 4-lobed, the lobes triangular; corolla 4-lobed, subcylindric; drupe ovoid, pointed, about 5 mm. long.

Mountain-sides, vicinity of Maricao, Porto Rico. Endemic. A peculiar species, not closely related to the others, perhaps generically distinct.

Varronia martinicensis Jacq. [*Cordia martinicensis* R. & S.], a species of the southern Lesser Antilles, with spicate flowers and large ovate serrate leaves was recorded by Grisebach as found on St. Croix, but the only species with spicate flowers now known from that island is *V. angustifolia* West.

6. **BOURRERIA** P. Browne; Jacq. Enum. 2, 14. 1760.

Shrubs or small trees, with alternate petioled entire leaves, and white flowers in terminal corymb-like cymes. Calyx campanulate, 2-5-lobed, the lobes valvate. Corolla salverform, the limb 5-lobed. Stamens 5, borne on the corolla-tube, the filaments filiform. Ovary sessile, 2-celled or incompletely 4-celled; styles 2-cleft or connate; stigmas flattened. Fruit a drupe, with thin flesh, inclosing 4 bony nutlets ridged on the back. [Commemorates J. A. Beurer, a Nuremberg apothecary.] About 25 species, of tropical America. Type species: *Bourreria succulenta* Jacq.

Leaves large, mostly 7-12 cm. long; style-branches connate; tall tree, sometimes shrubby.

Leaves small, mostly 2-5 cm. long; shrubs or small trees.

Style-branches connate.

Style-branches divaricate.

Leaves smooth above.

Leaves scabrous above.

1. *B. succulenta*.

2. *B. revoluta*.

3. *B. domingensis*.

4. *B. virgaia*.

1. *Bourreria succulenta* Jacq. Enum. 14. 1760.

Bourreria succulenta canescens O. E. Schulz in Urban, Symb. Ant. 4: 521. 1910.

A tree, up to about 10 m. high, usually lower, sometimes shrubby, the bark gray, smooth, the twigs, leaves and inflorescence glabrous in wet and moist districts, canescent or tomentose in dry regions, the branches spreading or drooping. Leaves elliptic to obovate, or the lower ones suborbicular, 5–12 cm. long, flat, chartaceous, the apex obtuse, acute or emarginate, the base narrowed or obtuse, the petioles 5–20 mm. long; inflorescence several-many-flowered; pedicels 2–12 mm. long; calyx campanulate, 5–7 mm. long, its lobes acute; corolla 7–10 mm. broad, its lobes rounded; stamens somewhat exserted; style-branches connate; drupe subglobose, orange or red, 8–11 mm. in diameter. [*Ehretia Bourreria* of Krebs, of Bello and of Sessé and Moçino, not of Linnaeus.]

Hillsides, plains and thickets, Porto Rico, at lower elevations; Mona; Icacos; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda; Anegada:—West Indies (except Bahamas). ROBLE GUAYO. PALO DE VACA. SPOON TREE.

2. *Bourreria revoluta* H.B.K. Nov. Gen. 3: 53. 1818.

Bourreria succulenta revoluta O. E. Schulz in Urban, Symb. Ant. 7: 59. 1911.

A small tree or shrub, the young twigs short-pilose or glabrous. Leaves elliptic to obovate, mostly 4 cm. long or shorter, glabrous or sparingly pubescent, smooth or scabrate, the apex rounded or obtuse, the base narrowed, the petioles 2–10 mm. long; inflorescence few-several-flowered; pedicels short; calyx 5–6 mm. long, somewhat pubescent; corolla about 10 mm. broad; drupe about 8 mm. in diameter.

Recorded by Schulz as collected by Gundlach near Quebradillas and Camuy, Porto Rico:—Florida; Cuba; Hispaniola.

3. *Bourreria domingensis* (DC.) Griseb. Fl. Br. W. I. 482. 1861.

Ehretia domingensis DC. Prodr. 9: 508. 1845.

A shrub, or a small tree 4–8 m. high, the twigs slender, densely leafy, glabrous, or when young sparingly pubescent. Leaves obovate or elliptic, 2–6 cm. long, smooth, subcoriaceous, glabrous or very nearly so, the apex rounded or emarginate, rarely mucronate, the base narrowed, the petioles 2–8 mm. long; inflorescence few, several-flowered, short-peduncled; calyx sparingly puberulent, about 6 mm. long, its lobes ovate, acute; corolla 10–12 mm. broad; style-branches divaricate; drupe red, subglobose, about 8 mm. in diameter.

Limestone hills in the dry southwestern districts of Porto Rico at low elevations, and near Quebradillas; Vieques:—Hispaniola. Perhaps not distinct from the following species.

4. *Bourreria virgata* (Sw.) G. Don, Gen. Hist. 4: 389. 1838.

Ehretia virgata Sw. Prodr. 17. 1788.

Bourreria virgata vestita O. E. Schulz in Urban, Symb. Ant. 7: 66. 1911.

A shrub or small tree, the twigs, leaves and inflorescence either glabrous or tomentose, the branches densely leafy. Leaves obovate, oblong or elliptic, subcoriaceous, 2–7 cm. long, scabrous above, pubescent or glabrous beneath, the apex rounded or emarginate, the base narrowed, the petioles 4–15 mm. long; inflorescence peduncled, 2-several-flowered; calyx 4–6 mm. long, canescent or tomentose, its teeth ovate, acute; corolla about 12 mm. broad; style-branches divaricate; drupe subglobose, 5–8 mm. in diameter.

Limestone hills in the dry southwestern parts of Porto Rico, at low elevations:—Hispaniola.

7. **ROCHEFORTIA** Sw. Prodr. 53. 1788.

Shrubs or small trees, mostly armed with spines, the leaves entire, petioled, often fascicled, the small, mostly dioecious, terminal flowers cymose or glomerate or solitary. Calyx 4–5-parted, the lobes imbricated. Corolla rotate, the tube very short, the 4 or 5 filaments filiform; anthers ovate. Disk thick. Ovary 2-celled or falsely 4-celled; styles 2, terminal, filiform; stigmas dilated. Drupe fleshy, globose, containing 4 hard nutlets. [Commemorates César de Rochefort, a French naturalist of the seventeenth century.] About 8 species, natives of the West Indies and northern South America. Type species: *Rochefortia cuneata* Sw.

Unarmed or with some short spines; peduncles slender, few-several flowered.

Very spiny; flowers solitary or 2 together, nearly sessile.

1. *R. cuneata*.

2. *R. acanthophora*.

1. **Rochefortia cuneata** Sw. Prodr. 54. 1788.

A shrub, or recorded as sometimes forming a small tree up to 8 m. high, glabrous and unarmed, or bearing a few short spines. Leaves obovate, membranous, 2–5 cm. long, the apex rounded or emarginate, the base narrowed or cuneate, the slender petioles about 1 cm. long or shorter; peduncles very slender, 0.5–3 cm. long, few-several-flowered; calyx campanulate, about 2 mm. long, its rounded lobes ciliate; corolla 8–10 mm. broad; drupe yellow, globose, about 6 mm. in diameter.

La Plata, near Guanica, collected by Sintenis, determined by Urban from barren specimens.—Jamaica; Hispaniola; Guadeloupe; Dominica; Martinique. The leaves of this plant much resemble those of *Torrubia discolor*.

2. **Rochefortia acanthophora** (DC.) Griseb. Fl. Br. W. I. 482. 1861.

Ehretia acanthophora DC. Prodr. 9: 510. 1845.

A usually small tree, 5–8 m. high, recorded as sometimes 15 m. high, often shrubby, densely and intricately branched, armed all over with straight slender stiff spines, 5–15 mm. long or longer, the tortuous, glabrous twigs rather densely leafy. Leaves obovate, spatulate or oval, subcoriaceous, 8–22 mm. long, shining above, glabrous or pubescent beneath, the petioles very short; flowers solitary or 2 together, nearly sessile; calyx about 2 mm. long; its short lobes ciliate; corolla small; drupe globose, yellowish, about 5 mm. in diameter.

Hillsides, thickets and arroyos, southern and southwestern dry districts of Porto Rico; St. Croix (according to Grisebach and to Eggers); St. Thomas; St. Jan:—Jamaica; Hispaniola; St. Martin; Antigua (according to Grisebach); St. Eustatius. JUZO.

Ehretia tinifolia L., a tree inhabiting Jamaica, Cuba and Hispaniola, was listed by Krebs in 1851 as found in St. Thomas, doubtless in error.

Family 5. **BORAGINACEAE** Lindl.

BORAGE FAMILY.

Herbs or shrubs. Leaves alternate, rarely opposite or verticillate, estipulate, mostly entire and hispid, pubescent, scabrous or setose. Flowers perfect, usually regular, in one-sided scorpioid spikes, racemes, cymes, or sometimes scattered. Calyx inferior, mostly 5-lobed, 5-cleft, or 5-parted, usually persistent. Corolla gamopetalous, mostly regular and 5-lobed, rarely irregular. Stamens as many as the corolla-lobes and alternate with them, inserted on the tube or throat; anthers 2-celled, the sacs longitudinally

dehiscent. Disk commonly inconspicuous. Ovary superior, of 2, 2-ovuled carpels, entire, or the carpels commonly deeply 2-lobed, making it appear as of 4, 1-ovuled carpels; style simple, entire or 2-cleft; ovules anatropous or amphitropous. Fruit mostly of 4, 1-seeded nutlets, or of 2, 2-seeded carpels. Endosperm fleshy, copious, or none; cotyledons mostly flat or plano-convex; radicle short. About 100 genera and 1,500 species or more, of wide distribution.

Fruit drupaceous.

Fruit hollowed at base; coastal silky-tomentose shrub.

Fruit not hollowed at base.

Fruit dry, of 2-4 nutlets.

Nutlets united in pairs forming a 2-lobed or didymous fruit.

Nutlets conic, ribbed, the fruit 2-lobed.

Nutlets subglobose, rugose, the fruit didymous.

Nutlets separating.

1. *Mallotonia*.

2. *Tournefortia*.

3. *Tiaridium*.

4. *Schobera*.

5. *Heliotropium*.

1. *MALLOTONIA* [Griseb.] Britton, Ann. Mo. Bot. Gard. 2: 47. 1915.

Silvery-silky shrubs of the seacoast, with alternate leaves and small white flowers in dense, 1-sided cymes, the fruits almost capitate. Calyx mostly 5-parted; corolla salverform, the 5-lobed limb shorter than the nearly cylindric tube, the lobes broad, valvate. Stamens short, included. Style simple. Drupe dry and bony, ovoid-conic, hollowed at the base, 2-pyrenous, the dissepiments solid. [Latin, related to *Mallota*.] One species, or perhaps 2, of tropical and subtropical distribution, the following typical.

1. *Mallotonia gnaphalodes* (L.) Britton, Ann. Mo. Bot. Gard. 2: 47. 1915.

Heliotropium gnaphalodes L. Syst. ed. 10, 913. 1759.

Tournefortia gnaphalodes R. Br.; R. & S. Syst. 4: 538. 1819.

A somewhat fleshy shrub, 3-12 dm. tall, with silky-tomentose foliage, much branched and often forming large clumps, the twigs densely leafy. Leaves numerous, linear-spatulate, 4-10 cm. long, obtuse; inflorescence with 2-4 recurved branches; calyx campanulate, tomentose, its lobes 2-3 mm. long, oblong; corolla-tube somewhat surpassing the calyx, its limb 4-5 mm. broad; fruit ovoid, 5 mm. high, black, with 2 nutlets.

Coastal sands, Porto Rico, Mona; Icacos; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Virgin Gorda; Anegada:—Florida; Bermuda; West Indies; Central America. NIGUA DE PLAYA, TE DEL MAR. BAY LAVENDER. TEMPORANA.

2. *TOURNEFORTIA* L. Sp. Pl. 140. 1753.

Trees, shrubs or vines, with alternate entire leaves, and small secund flowers in terminal, often forked cymes, the cyme-branches usually elongated. Calyx persistent, 5-parted. Corolla mostly salverform, the tube cylindric, swollen above, the lobes spreading. Stamens 5, borne on the corolla-tube, included; filaments short; anthers ovate to lanceolate. Ovary 4-celled; style terminal, 2-lobed at the apex. Drupe small, the exocarp fleshy or corky, containing 4 nutlets or fewer. [Commemorates Joseph Pitton de Tournefort, 1656-1708, renowned French botanist.] Over 100 species of tropical and subtropical regions. The name NIGUA is applied to the species in Porto Rico. Type species: *Tournefortia hirsutissima* L.

A. Drupe subglobose, or ovoid, not lobed.
Woody vines or tall shrubs with large elliptic leaves.
Branches and leaves hirsute.

1. *T. hirsutissima*.

Branches and leaves glabrous, or when young sparingly appressed-pubescent or puberulent.

Corolla-tube stout, about 3 times as long as the calyx.

Corolla-tube very slender, 4-5 times as long as the calyx.

Low shrub with small scabrous leaves.

B. Drupe 2-4-lobed.

Corolla-tube 4-7 mm. long; rather stout vines or shrubs.

Corolla-tube 6-7 mm. long, its lobes filiform-appendaged.

Corolla-tube about 4 mm. long, its lobes acuminate.

Corolla-tube only about 2 mm. long; slender vines.

Leaves various, small, short-petioled, mostly 1-3 cm. long.

Leaves ovate to oblong-lanceolate, slender-petioled, mostly 4-8 cm. long.

2. *T. bicolor*.

3. *T. filiflora*.

4. *T. scabra*.

5. *T. laurifolia*.

6. *T. peruviana*.

7. *T. microphylla*.

8. *T. volubilis*.

1. *Tournefortia hirsutissima* L. Sp. Pl. 140. 1753.

A stout short-hirsute vine, up to 5 m. long or longer, or shrubby. Leaves elliptic or ovate-elliptic, thin, 8-20 cm. long, short-hirsute beneath, scabrate-hirsute above, the apex acuminate, acute or rarely obtuse, the base narrowed or obtuse, the stout petioles 1-2 cm. long, inflorescence usually ample, corymbose, many-flowered, 6-15 cm. broad, the branches densely several-many-flowered, short in flower, in fruit 3-4 cm. long; sepals about 3 mm. long, ovate, acuminate; corolla white, its tube densely strigose, 4-6 mm. long, its lobes ovate, acute; drupe globose, white, about 5 mm. in diameter.

Thickets, river-banks and forest borders, Porto Rico, at lower and middle elevations, in dry and moist districts; Mona; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Florida; Jamaica; Cuba; Hispaniola; St. Martin to Trinidad; Margarita; continental tropical America. CHIGGERY GRAPES. CHIGGERNIT.

2. *Tournefortia bicolor* Sw. Prodr. 40. 1788.

Tournefortia laevigata Lam. Tabl. Encycl. 1: 416. 1791.

A rather stout vine, 1-6 m. long or longer, sometimes shrubby, the young branches sparingly short-pubescent. Leaves elliptic to ovate-elliptic, or oblong-elliptic, thin, darker green above than beneath, 6-15 cm. long, glabrous or nearly so on both sides, smooth or scabrate above, the apex acute or acuminate, the base rounded or narrowed, the petioles 1-3 cm. long; inflorescence corymbose, usually many-flowered, 6-15 cm. long, its branches short in flower, 2-5 cm. long in fruit, hispidulous or strigose; sepals about 2 mm. long, ovate, acute; corolla white, its tube strigose, 2-3 times as long as the calyx; drupe subglobose, about 4 mm. in diameter; flowers fragrant.

Thickets, woodlands and forests, Porto Rico, at lower and middle elevations in moist and wet districts; St. Thomas;—Jamaica; Cuba; Hispaniola; Saba to Trinidad; continental tropical America.

3. *Tournefortia filiflora* Griseb. Fl. Br. W. I. 483. 1861.

A shrub, 2-4 m. high, the young branches and the inflorescence puberulent or strigillose. Leaves elliptic, glabrous, 1-3.5 cm. long, paler green beneath than above, the apex acute or acuminate, the base narrowed, the petioles about 5 cm. long or shorter; inflorescence ample, strigillose, its branches slender, 2-6 cm. long; sepals about 2 mm. long, lanceolate; corolla white, its strigose tube slender, about 4 times as long as the calyx; drupe globose, about 4 mm. in diameter, white. [*T. foetidissima* of de Candolle, of Krebs, of Eggers, and of Stahl, not of Linnaeus.]

Woods and forests in moist and wet districts, Porto Rico, mostly at middle or higher elevations; St. Croix (according to West); St. Thomas (according to Krebs); St. Jan (according to Eggers):—St. Martin to St. Vincent.

4. *Tournefortia scabra* Lam. Tabl. Encycl. 1: 417. 1791.

A low vine-like shrub, about 2 m. long or less, the slender branches often straggling, strigose when young. Leaves oblong to lanceolate, coriaceous, rigid,

2–4.5 cm. long, scabrous above, scabrous-pubescent beneath, the apex acute or obtuse, the base rounded or narrowed, the petioles 1.5–5 mm. long; inflorescence strigose-pubescent, about 5 cm. broad or smaller, its few branches 2–4 cm. long; sepals ovate or ovate-lanceolate, strigose, about 2 mm. long; corolla white or yellowish, its strigose tube about 4 mm. long; fruit ovoid, white, about 3 mm. long. [*T. incana* of Stahl, not of Lamarck.]

Thickets at lower elevations in the dry southwestern districts of Porto Rico near the coast:—Cuba; Hispaniola. Recorded by Krebs from St. Thomas.

5. *Tournefortia laurifolia* Vent. Choix des Plantes 2. 1803.

Messerschmidia laurifolia R. & S. Syst. 4: 543. 1819.

A rather slender vine, 2–6 m. long, or shrubby, the young shoots and inflorescence sparingly strigillose. Leaves ovate to elliptic, membranous, glabrous on both sides, 5–12 cm. long, the apex acute or acuminate, the base rounded or narrowed, the petioles about 2 cm. long or shorter; inflorescence slender-peduncled, 2–3-branched, the slender branches about 10 cm. long or less, several-many flowered; sepals ovate or lanceolate, acute or acuminate, about 2 mm. long; corolla greenish yellow, its strigillose tube about 6 mm. long, its ovate lobes acuminate, filiform-appendaged; drupe 2–4-lobed, smooth, 7–8 mm. broad. [*T. volubilis* of Sessé & Mocino, not of Linnaeus.]

Wooded hills and forests, in wet or moist districts, mostly at middle or higher elevations, Porto Rico. Endemic. Erroneously recorded from St. Thomas by Ventenat and by de Candolle. BEJUCO MASA.

6. *Tournefortia peruviana* Poir. in Lam. Encycl. Suppl. 4: 425. 1816.

A rather slender vine, 2–5 m. long or longer, or shrubby, the young branches and the inflorescence strigillose or glabrate. Leaves ovate or elliptic, thin, glabrous on both sides, 4–8 cm. long, the apex acute or acuminate, the base mostly rounded or obtuse, the petioles about 2 cm. long or shorter; inflorescence several-branched, the slender branches 2–7 cm. long; sepals 1.5–2 mm. long, ovate, acute; corolla greenish or yellowish, its strigose tube about 4 mm. long, its lobes ovate, acuminate; drupe 2–4-lobed, 4–5 mm. broad, yellow. [*T. scandens* of Willdenow, not of Miller; *T. laurifolia* of Grisebach and of Bello, not of Ventenat.]

Thickets, Coamo River Valley at Moreno and near Mayaguez, Porto Rico:—Cuba; Hispaniola; Mexico to Peru and Brazil.

7. *Tournefortia microphylla* Bert.; Spreng. Syst. 1: 644. 1825.

T. volubilis microphylla DC. Prodr. 9: 523. 1845.

A slender woody vine, often somewhat fleshy, 1–3 m. long, the young branches and inflorescence strigillose. Leaves ovate to elliptic or lanceolate, small, 1–3 cm. long, glabrous, or puberulent beneath, the apex obtuse, rounded or sometimes acute, the base rounded or narrowed, the petioles about 4 mm. long or shorter; inflorescence slender-peduncled, its few branches very slender, 2–3 cm. long; sepals lanceolate, 1–1.5 mm. long; corolla greenish, its tube about twice as long as the calyx, its lanceolate lobes acute; drupe usually 4-lobed, depressed, about 4 mm. broad, white, with 4 black spots.

Hillsides and thickets at low elevations in the dry southern districts of Porto Rico; Mona; Icacos; Vieques, St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Hispaniola; St. Martin. Recorded from Antigua and from northwestern South America. A race with lanceolate acute leaves occurs on St. Croix and St. Thomas.

8. *Tournefortia volubilis* L. Sp. Pl. 140. 1753.

Messerschmidia volubilis R. & S. Syst. 4: 541. 1819.

A slender, woody vine, sometimes 3.5 m. long, the branches and leaves pubescent, puberulent or glabrate. Leaves ovate to oblong or oblong-lanceolate,

2–8 cm. long, thin, acute or acuminate at the apex, narrowed or obtuse at the base, the slender petioles 5–15 mm. long; inflorescence slender-peduncled, of several very slender branches 2–4 cm. long; sepals about 1 mm. long, ovate-lanceolate, acute; corolla greenish-white, twice as long as the calyx, its lobes linear-subulate, shorter than the tube; fruit 2–4-lobed, with 2–4 black spots, depressed, 2–3 mm. broad. [*Tournefortia ferruginea* of Grisebach, apparently not of Lamarck; ? *T. canescens* of Krebs.]

Thickets at lower elevations in moist districts, Porto Rico; Vieques; St. Croix (according to Eggers); St. Thomas; St. Jan.—Florida; Texas; West Indies; continental tropical America.

Tournefortia glabra L. was erroneously recorded by Krebs from St. Thomas [*T. cymosa* L.].

3. TIARIDIUM Lehm. Asperif. 13. 1818.

A coarse annual herb, with broad alternate thin long-petioled leaves, and small blue 5-parted flowers in elongated bractless scorpioid spikes. Sepals lanceolate or ovate-lanceolate, acute. Corolla salverform, its tube rather slender, longer than the limb, its broad lobes undulate. Stamens included. Style very short; nutlets united in pairs, conic, strongly ribbed, forming a mitriform fruit. [Greek, like a tiara, referring to the fruit.] A monotypic genus.

1. *Tiaridium indicum* (L.) Lehm. Asperif. 14. 1818.

Heliotropium indicum L. Sp. Pl. 130. 1753.

Helioophytum indicum DC. Prodr. 9: 556. 1845.

Hirsute or hispid; stem 3–9 dm. high. Leaves ovate or oval, obtuse, rounded or subcordate at the base, 5–15 cm. long, repand or undulate-margined, petioled; flowers 4–6 mm. broad, sessile in dense, terminal or also lateral, usually solitary, scorpioid spikes; sepals acute, shorter than the strigose corolla-tube; style very short, deciduous; fruit deeply 2-lobed, glabrous, about 2.5 mm. long. [*Helioophytum parviflorum* of Bello, not of Linnaeus.]

Waste and cultivated grounds, Porto Rico; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Virgin Gorda.—Florida; West Indies; continental tropical America. Naturalized from the Old World tropics. COTORRERA. INDIAN HELIOTROPE.

4. SCHOBERA Scop. Introd. 158. 1777.

Annual or perennial herbs, with alternate entire leaves, and small 5-parted flowers in ebracteate scorpioid spikes. Calyx 5-parted. Corolla salverform, with a short tube, its lobes imbricated, obtuse. Stamens short, included. Nutlets united in pairs, forming a didymous fruit. [Commemorates Gottlieb Schöber, explorer.] About 10 species of tropical America, the following typical.

1. *Schobera angiosperma* (Murr.) Britton.

Heliotropium angiospermum Murray, Prod. Stirp. Goett. 217. 1770.

Heliotropium parviflorum L. Mant. 2: 201. 1771.

Helioophytum parviflorum DC. Prodr. 9: 553. 1845.

Helioophytum portoricense Bello, Anales Soc. Esp. Hist. Nat. 10: 297. 1881.

Annual, or sometimes of longer duration, loosely pubescent, branched, 2–8 dm. high, or vine-like and 1 m. long. Leaves oblong-lanceolate to elliptic, 7 cm. long or less, acute or short-acuminate at the apex, narrowed at the base, the petioles 5–15 mm. long; spikes solitary or 2 together, slender, 5–15 cm. long; sepals acute; corolla white, bearded in the throat, about 2 mm. broad, its tube

about as long as the calyx; fruit didymous, depressed, 3–4 mm. broad finely, pubescent.

Banks, thickets, waste and cultivated grounds at lower elevations, Porto Rico; Mona; Icacos; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Florida; West Indies; continental tropical America. SCORPION-TAIL. COTORRILLA.

5. *HELIOTROPIUM* [Tourn.] L. Sp. Pl. 130. 1753.

Herbs or shrubs, with alternate mostly entire leaves, and small blue or white flowers, in scorpioid spikes, or scattered. Calyx-lobes or sepals lanceolate, ovate, or linear. Corolla salverform or funnelform, its tube cylindric, its lobes imbricated, plicate or induplicate in the bud. Stamens included; filaments short, or none. Stigma conic or annular. Fruit separating into 4, 1-seeded nutlets. [Greek, sun-turning, *i. e.*, turning to or with the sun.] About 100 species, widely distributed. Type species: *Heliotropium europaeum* L.

Plant glabrous, fleshy.

Plants pubescent or strigose, not fleshy.

Annual; leaves oblong or oval or oblong-spatulate.

Perennial herbs or shrubs.

Shrub 4–20 dm. high.

Low herbs or shrubs.

Flowers in bracted spikes.

Flowers mostly solitary at the axils, peduncled, or in terminal racemes.

Plant densely white-strigose.

Plants green, loosely strigose or pilose.

Leaves and flowers very nearly sessile.

Leaves distinctly petioled; flowers slender-peduncled.

1. *H. curassavicum*.

2. *H. inundatum*.

3. *H. ternatum*.

4. *H. fruticosum*.

5. *H. crispiflorum*.

6. *H. guanicense*.

7. *H. antillanum*.

1. *Heliotropium curassavicum* L. Sp. Pl. 130. 1753.

Annual, fleshy, more or less glaucous, diffuse, the branches 1.5–4.5 dm. long. Leaves linear, or linear-oblong, entire, inconspicuously veined, 2–5 cm. long, 3–6 mm. wide, obtuse, narrowed into petioles, or the upper sessile; scorpioid spikes dense, bractless, mostly in pairs; flowers about 4 mm. broad; calyx-segments acute; corolla white with a yellow eye or changing to blue; stigma umbrella-shaped; anthers acuminate; fruit subglobose. [? *H. portulacoides* of Bello.]

Saline soil along the coasts, Porto Rico; Icacos; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Florida to Texas; Bermuda; West Indies; continental tropical America; Old World tropical coasts. SEASIDE HELIOTROPE. COTORRERA DE LA PLAYA.

2. *Heliotropium inundatum* Sw. Prodr. 40. 1788.

Heliotropium cinereum H.B.K. Nov. Gen. 3: 89. 1818.

Annual, often branched from the base, 1–6 dm. tall, the stems and leaves gray-strigose. Leaves oblong to oval or oblong-spatulate, 2–5 cm. long, obtuse at the apex, narrowed at the base, short-petioled; spikes 1 or few, slender, at length 3–6 cm. long; calyx 2–3 mm. long, its lobes linear-lanceolate; corolla white, about as long as the calyx, its lobes lanceolate; nutlets subglobose, about 1 mm. in diameter. [*Lisianthus chelonioides* of Stahl, not of Linnaeus.]

Wet or moist open situations at low elevations, Porto Rico:—Bahamas; Jamaica; Cuba; Hispaniola; Guadeloupe; Trinidad; continental tropical America. SLENDER HELIOTROPE. COTORRERA DE AGUA.

3. *Heliotropium ternatum* Vahl, Symb. 3: 21. 1794.

Tournefortia humilis L. Sp. Pl. 141. 1753. Not *H. humile* Lam. 1791.
Heliotropium humile R. Br. Prodr. 1: 497. 1810.

A strigose-pubescent, bushy-branched shrub 2 m. high or less, the branches slender, ascending. Leaves lanceolate or linear, sessile, subverticillate in 3's.

or opposite, or alternate, 1–3 cm. long, 1.5–8 mm. wide, acutish, revolute-margined, rough-strigose on both sides; flowers white, in short terminal spikes; calyx about 3 mm. long, its lobes ovate, acute; corolla-tube somewhat longer than the calyx, the limb 3–4 mm. wide; nutlets subglobose. [*H. fruticosum* of Krebs, of Eggers and of Millspaugh.]

Thickets and hillsides in the dry southwestern districts, Porto Rico; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Virgin Gorda:—Bahamas; Jamaica; Cuba ?; Hispaniola; Saba (ex Kuntze) Antigua to St. Vincent; Bonaire; Curaçao; Aruba; continental tropical America. BUSHY HELIOTROPE.

4. *Heliotropium fruticosum* L. Syst. ed. 10, 913. 1753.

Heliotropium campechianum H.B.K. Nov. Gen. 3: 86. 1818.

? *Heliotropium humile* Lam. Tabl. Encycl. 1: 393. 1791.

Herbaceous, apparently annual, erect, branched, strigose, 1.5–3 dm. high, the branches slender. Leaves linear-oblong to oblong-lanceolate, strigose, subsessile, or the lower short-petioled, 1–2.5 cm. long, the apex acute or obtuse, the base narrowed; flowers nearly sessile, in slender elongated spikes which usually bear some leaf-like bracts; sepals ovate, strigose, about 1.5 mm. long; corolla white, 1–2 mm. wide; nutlets subglobose. [? *H. filiforme* of Grisebach, not of Kunth.]

Fields and pastures in the dry southwestern districts of Porto Rico at low elevations:—Jamaica; Cuba; Hispaniola; Margarita, Curaçao; Aruba; Guatemala to Colombia. The specific name *fruticosum* is misleading.

5. *Heliotropium crispiflorum* Urban, Symb. Ant. 1: 394. 1899.

A low, much-branched shrub, about 3 dm. high or less, densely white-strigose, the branches very slender. Leaves mostly opposite, some of them alternate, 2–7 mm. long, nearly sessile, linear to oblong-lanceolate or ovate-lanceolate, the apex acute or obtuse, the base narrowed, both surfaces white-strigose; flowers short-pedicelled in very slender terminal racemes which sometimes bear some leaf-like bracts; sepals lanceolate to ovate-lanceolate, acute, strigose, about 2 mm. long; corolla white, about 4 mm. broad, its lobes ovate, crisped, rounded; nutlets subglobose.

Calcareous hillsides, dry southwestern districts of Porto Rico; Mona; Anegada:—Hispaniola.

6. *Heliotropium guanicense* Urban, Symb. Ant. 1: 395. 1899.

Perennial, somewhat woody, much-branched from the base, the slender, loosely strigose branches about 10 cm. long or less, spreading as ascending. Leaves ovate to elliptic, 2–4 mm. long, loosely strigose on both sides, nearly sessile, the apex obtuse or acute, the base mostly narrowed; flowers solitary at the upper axils; peduncles 2 mm. long or shorter; sepals oblong, ovate or oblong-lanceolate, about 1 mm. long, narrowed below; corolla about 2 mm. broad, its lobes linear-lanceolate, nutlets very small, globose.

Punta de Aguila, near Salinas de Cabo Rojo, Porto Rico. Endemic. Known only from this locality, on the southwestern coast, many kilometers from Guanica.

7. *Heliotropium antillanum* Urban, Symb. Ant. 4: 528. 1910.

Herbaceous, apparently perennial, with several or many slender, prostrate or ascending, pilose stems 1–6 dm. long. Leaves oblong to oblong-lanceolate, 3–9 mm. long, sparingly pilose, or glabrous, the apex obtuse or acute, the base narrowed, the petioles 1–1.5 mm. long; flowers solitary at or above the axils; peduncles 2–6 mm. long; sepals lanceolate, pilose, about 2 mm. long; corolla white with a yellow eye, 3–4 mm. wide, its lobes rounded; nutlets very small.

Northern coastal plain between Dorado and Vega Baja, Porto Rico, collected only by Stahl:—Cuba.

Heliotropium peruvianum L., GARDEN HELIOTROPE, HELIOTROPO, Peruvian, often grown in Porto Rican and Virgin Island gardens for its fragrant flowers, is a perennial pubescent herb 5–8 dm. high, the leaves oblong-lanceolate, acute, 2–8 cm. long, the small, usually purple, fragrant flowers in terminal clusters.

Cochranea anchusaefolia (Poir) Gürcke, South American, recorded as found long ago by Gundlach near San Juan, perhaps in cultivation, is a hirsute perennial with oblong or oblong-lanceolate leaves 2–8 cm. long, the flowers violet-blue, about 5 mm. broad, spicate. [*Heliotropium anchusaefolium* Poir.]

Borago officinalis L., BORA, BORAGE, European, found by Sintenis in cultivation near Lares, Porto Rico, is a rough-hispid herb with oblong or obovate leaves 5–12 cm. long, and showy blue flowers in terminal racemes.

Family 6. VERBENACEAE J. St. Hil.

VERVAIN FAMILY.

Herbs, shrubs or some tropical genera trees, with opposite verticillate, or rarely alternate leaves, and perfect irregular or regular flowers, in spikes, racemes, cymes or panicles. Calyx inferior, mostly persistent, usually 4–5-lobed or 4–5-cleft. Corolla-tube cylindric and the limb 4–5-cleft. Stamens 4, didynamous, rarely only 2, or as many as the corolla-lobes, inserted on the corolla and alternate with its lobes; anthers 2-celled, the sacs longitudinally dehiscent. Ovary superior, 2–4-celled (rarely 8–10-celled), composed of 2 carpels, each carpel with 2 anatropous or amphitropous ovules, thus in 4-celled ovaries 1 ovule in each cavity; style terminal; stigmas 1 or 2. Fruit dry, separating at maturity into 2–4 nutlets, or a drupe containing the 2–4 nutlets. Endosperm little or none, or rarely fleshy; embryo straight. About 75 genera and 1,300 species, of wide geographic distribution.

A. Inflorescence centripetal.

1. Flowers capitate or spicate.

- a. Fruit with 4, 1-seeded nutlets or 1-seeded cavities.
Calyx nearly tubular, enclosing the fruit.
Ripe calyx broadly campanulate; fruit 2–4-horned.
- b. Fruit with 2 drupelets or nutlets, or only one.
*Drupelets or nutlets 1-celled, 1-seeded.

†Stamens 4.

Calyx very small, its tube membranous.

Fruit drupaceous.

Fruit dry or nearly so.

Flowers in long slender spikes; bracts deciduous.

Flowers densely capitate or short-spicate; bracts persistent.

Calyx tubular; fruit linear, dry; flowers spicate; low herbs.

††Stamens 2; flowers in long spikes.

**Drupelets 2-celled, 2-seeded.

2. Flowers racemose; fruit drupaceous.

Drupe with 2 nutlets; leaves alternate.

Drupe with 4 nutlets; leaves opposite or whorled.

B. Inflorescence centrifugal.

1. Seeds laterally attached.

a. Flowers regular; stamens all alike.

Drupe with several stones; shrubs.

Stigma-lobes very short, subtruncate.

Stigma-lobes filiform.

Drupe with 1, 2–4-celled stone; tree with simple leaves.

b. Flowers irregular; stamens in 2 dissimilar pairs.

*Drupe with 1, 4-celled stone.

Stamens 2 fertile, 2 sterile staminodes; trees with simple leaves.

All 4 stamens fertile; trees with digitately compound leaves.

**Drupe with 4 stones.

Spiny shrub with long slender branches; stones of the drupe united in pairs.

1. *Verbena*.

2. *Ghinia*.

3. *Lantana*.

4. *Aloysia*.

5. *Lippia*.

6. *Bouchea*.

7. *Valerianoides*.

8. *Priva*.

9. *Citharexylum*.

10. *Duranta*.

11. *Callicarpa*.

12. *Aegiphila*.

13. *Petitia*.

14. *Cornutia*.

15. *Vitex*.

16. *Volkameria*.

Unarmed herbs or shrubs, the stones of the drupe not united in pairs.

Corolla-tube not very much longer than the lobes.

Corolla-tube very much longer than the short lobes.

2. Seeds pendulous; marsh tree with capsular fruit.

17. *Clerodendrum*.

18. *Siphonanthus*

19. *Avicennia*.

1. *VERBENA* [Tourn.] L. Sp. Pl. 18. 1753.

Herbs (some exotic species shrubby), mostly with opposite leaves, and bracted flowers in terminal spikes. Calyx usually tubular, 5-angled, unequally 5-toothed. Corolla salverform or funnelform, the limb spreading, regular or nearly so. Connective of the anthers unappendaged, or sometimes provided with a gland. Ovary 4-celled; ovule 1 in each cavity; style usually short, 2-lobed at the summit, one of the lobes stigmatic. Fruit mostly enclosed by the calyx, at length separating into 4, 1-seeded linear or linear-oblong crustaceous nutlets. [Latin name of a sacred herb.] About 100 species, natives of America, or a single one indigenous in the Mediterranean region.

1. *Verbena scabra* Vahl, Eclog. 2: 2. 1798.

Annual, or perhaps of longer duration; stem rather slender, erect, simple or branched, 1–1.5 m. high, pubescent with spreading hairs. Leaves 2–8 cm. long, ovate to lanceolate, papillose-scabrous above, pubescent on the veins beneath, regularly dentate nearly all around, acute or acuminate at the apex, slender-petioled; spikes very slender, spreading, often 15 cm. long, rather densely many-flowered; calyx about 2 mm. long, its lobes acute, converging over the fruit; corolla pinkish, about 4 mm. wide; nutlets nearly 2 mm. long. [*V. urticaefolia* of Bello and of Stahl, not of Linnaeus.]

Fields, roadsides, river-banks, cultivated and waste grounds, Porto Rico:—south-eastern United States; Bermuda; Jamaica; Hispaniola; Central America.

Verbena chamaedrifolia Juss., GARDEN VERBENA, South American, planted for ornament in Porto Rico and Virgin Island gardens, is pubescent, with usually tufted stems about 3 dm. long, ovate or oblong, serrate leaves 2–5 cm. long, and red, scarlet or purple flowers in compact terminal clusters, the corolla-limb about 12 mm. broad.

2. *GHINIA* Schreb. Gen. 19. 1789.

[*TAMONEA* Aubl. Pl. Guian. 2: 659, pl. 268. 1775.

Not Aubl. 1: 441, pl. 175. 1775.]

Herbs or low shrubs, with slender stiff branches, opposite, nearly sessile, dentate or incised leaves, and small bracted flowers in terminal and axillary slender spikes or racemes. Calyx tubular, subtruncate, 5-ribbed, the ribs excurrent as short teeth. Corolla with a cylindric tube slightly enlarged above, and an oblique spreading 5-cleft limb. Stamens 4, didynamous, borne on the corolla-tube, included; anther-sacs parallel, the connective with a gland-like appendage. Ovary nearly completely 4-celled; ovule 1 in each cavity; style short; stigma oblong. Fruit small, hard, mostly 4-horned, 4-celled. Seeds usually 4, without endosperm. [Commemorates L. Ghini, 1500–1556, Italian physician and botanist.] Four or five species of tropical America. Type species: *Tamonea spicata* Aubl.

1. *Ghinia spinosa* (Sw.) Britton & Wilson.

Tamonea spinosa Sw. Prodr. 94. 1788.

Ghinia verbenacea Sw. Fl. Ind. Occ. 1089. 1800.

Shrubby, much branched, about 6 dm. high or less, the slender branches finely pubescent and scabrous. Leaves puberulent, very short-petioled or sessile, the lower ones oblong, 1 cm. long or less, incised-pinnatifid with obtuse or rounded lobes, the upper ones linear, entire, 1.5–2.5 cm. long; flowers distant, about 5 mm. long, in slender racemes, short-pedicelled, purple or whitish; fruiting calyx obconic, its teeth about 0.5 mm. long; horns of the glabrous shining fruit about 4 mm. long.

Rocky thickets and hillsides at lower elevations in dry parts of the southwestern districts of Porto Rico:—Antigua. CARDERO.

3. *LANTANA* L. Sp. Pl. 626. 1753.

Shrubs, or rarely herbs, with pubescent foliage, the stems sometimes armed with prickles. Leaves opposite or verticillate, toothed. Flowers in dense heads or spikes. Calyx membranous, with a truncate or sinuate border. Corolla-tube slender, often curved, sometimes slightly dilated above, the limb more or less 2-lipped, the lobes 4 or 5. Stamens 4, didynamous; filaments adnate to about the middle of the corolla-tube. Ovary 2-celled; stigma oblique; ovules solitary in each cavity. Fruit small, drupe-like. Nutlets 2-celled or separating into 2 one-seeded nutlets. [Named from fancied similarity to *Viburnum Lantana*.] About 60 species, natives of tropical and warm regions, known as *CARIAQUILLO* and *SAGE*. Type species: *Lantana Camara* L.

- | | |
|---|----------------------------|
| Corolla yellow to orange or changing to pink red or rose. | |
| Corolla orange, changing to red; stems smooth or prickly. | 1. <i>L. Camara</i> . |
| Corolla yellow to orange, changing to pink or rose; stems armed with curved prickles. | 2. <i>L. aculeata</i> . |
| Corolla white to lilac or purple. | |
| Heads depressed-globose, involucrate; leaves opposite. | 3. <i>L. involucreta</i> . |
| Heads becoming much longer than thick, not involucrate, leaves mostly whorled in 3's. | 4. <i>L. trifolia</i> . |

1. *Lantana Camara* L. Sp. Pl. 627. 1753.

Lantana scabrida Soland. in Ait. Hort. Kew 2: 352. 1789.

A branching shrub 0.6–1.5 m. tall, rigid-pubescent, unarmed, or prickly. Leaves ovate to oblong-ovate, petioled, 2–12 cm. long, obtuse, acute, or short-acuminate, crenate-serrate, rounded or narrowed at the base; bracts oblong to lanceolate, 4–7 mm. long; calyx very thin, 3 mm. long; corolla orange-yellow or orange, changing to red, the tube about 1 cm. long, puberulent, slightly curved, barely enlarged above the middle, the limb 6–8 mm. wide; drupes black, about 3 mm. in diameter.

Hillsides, woods and thickets in both wet and dry districts, Porto Rico, ascending to higher elevations; Culebra; Vieques; Mona; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Florida; Bermuda; Jamaica; Cuba; Hispaniola; St. Martin to Trinidad and Aruba; continental tropical America. Races differ in size and shape of leaves, in presence or absence of prickles and in size of flowers. The smaller-leaved plants are mostly in dry districts. RED SAGE. YELLOW SAGE.

2. *Lantana aculeata* L. Sp. Pl. 627. 1753.

A shrub, 1–2 m. high, or sometimes with longer, half-climbing stems, the slender, sparingly pubescent, 4-sided branches armed with stout flattened hooked prickles 2–4 mm. long. Leaves ovate to ovate-lanceolate, petioled, 5–8 cm. long, crenate, reticulate-veined, acute or acuminate at the apex, narrowed to the base; peduncles 3–8 cm. long; heads several-many-flowered, not involucrate,

the narrow bracts pubescent, 4–6 mm. long; corolla about 12 mm. long, yellow to orange, turning pink or rose, its limb 6–8 mm. broad.

Roadsides, waste grounds and river-banks, Porto Rico, at lower elevations; St. Croix; St. Thomas; Virgin Gorda:—Bermuda (introduced); Cuba; Hispaniola; Martinique; Montserrat; Guadeloupe; Tobago. PRICKLY SAGE. PINK SAGE.

3. *Lantana involucrata* L. Cent. Pl. 2: 22. 1756.

Lantana odorata L. Syst. ed. 12, 418. 1767.

A pubescent, much branched shrub, 6–15 dm. high, or occasionally a small tree 4 m. high, the branches stiff, nearly terete, the bark narrowly fissured. Leaves elliptic or ovate, petioled, 1–4 cm. long, crenulate, obtuse at the apex, narrowed or obtuse at the base, scabrous above, pubescent beneath; peduncles 1–5 cm. long, slender; heads several-flowered, involucre by several ovate or ovate-lanceolate bracts 3–6 mm. long; corolla lilac, violet or white, its tube 6–8 mm. long; drupes blue, about 3 mm. in diameter. [*L. reticulata* of Eggers.]

Hillsides and thickets, Porto Rico, at lower and middle elevations, most abundant along and near the coasts; Icacos; Culebra; Vieques; Muertos; Mona; Desecheo; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda; Anegada:—Florida; Bermuda; West Indies; Central America; Galapagos. Races differ in size, shape and venation of leaves, in pubescence and in color of flowers. SANTA MARIA. WILD SAGE. BUTTON SAGE.

4. *Lantana trifolia* L. Sp. Pl. 626. 1753.

Camara trifolia Kuntze, Rev. Gen. Pl. 504. 1891.

Rough-pilose, at least above, about 2.5 m. high or less. Leaves oblong-lanceolate to elliptic-lanceolate, verticillate in 3's or some of them opposite, crenate-serrate, petioled, 5–12 cm. long, pubescent, rather thin, the apex acute or acuminate, the base narrowed; peduncles slender, shorter than the leaves; flower-heads dense, at first subglobose, 1–1.5 cm. in diameter, in fruit elongating, oblong, 2–3 cm. long; bracts short, narrow; corolla pink, lavender or purple, its tube 5–6 mm. long; drupes purple or lavender, 2–3 mm. in diameter.

Near Guayama, Porto Rico, and recorded from the western part of that island:—Jamaica; Cuba; Hispaniola; Martinique; St. Vincent; Tobago; Trinidad; continental tropical America.

Lantana Sellowiana Link & Otto, WEEPING or TRAILING LANTANA, South American, occasionally planted for ornament in Porto Rico gardens, has weak pubescent vine-like stems about 1 m. long, with oval or ovate leaves 2–3 cm. long, the lilac or purple flowers in peduncled heads, the corolla-limb about 8 mm. wide.

4. *ALOYSIA* Ortega; Pers. Syn. 2: 139. 1807.

Aromatic shrubs with opposite or verticillate leaves and small flowers in axillary or paniced slender spikes or racemes, their small bracts deciduous. Calyx angled, not flattened, 4-toothed, the teeth nearly equal. Corolla 2-lipped, the lips nearly equal in length. Stamens 4, didynamous. Ovary 2-celled. Nutlets 2, thin-walled. [Dedicated to Maria Louisa, wife of King Charles IV of Spain.] About 12 species, natives of warm-temperate and tropical America, the following typical.

1. *Aloysia triphylla* (L'Her.) Britton.

Verbena trifolia L'Her. Stirp. Nov. 1: 21. 1784.

Zapania citriodora Lam. Tabl. Encycl. 1: 59. 1791.

Aloysia citriodora Ortega; Pers. Syn. 2: 139. 1807.

Lippia citriodora H.B.K. Nov. Gen. 2: 269. 1817.

Lippia triphylla Kuntze, Rev. Gen. Pl. 3²: 253. 1898.

Stem roughish-puberulent above, branched, 1-3 m. high, the branches slender, striate. Leaves lanceolate, thin, resinous-dotted beneath, strongly aromatic, verticillate in 3's or 4's, short-petioled, nearly or quite entire, 4-7 cm. long, the apex acuminate, the base narrowed; spikes many-flowered, 4-6 cm. long, verticillate in the upper axils and in a terminal panicle; calyx densely puberulent, about 2 mm. long; corolla white, its tube somewhat longer than the calyx.

Sparingly spontaneous after cultivation in Porto Rico. Native of South America. Widely cultivated in tropical regions for its foliage. YERBA LUISA. LEMON VERBENA.

5. **LIPPIA** L. Sp. Pl. 633. 1753.

Perennial herbs, or shrubs, with opposite, or rarely alternate leaves, and small bracted flowers, in spikes or heads. Calyx small, ovoid, campanulate, or compressed and 2-winged, 2-4-toothed or 2-4-cleft. Corolla-tube cylindric, the limb oblique, somewhat 2-lipped, 4-cleft. Stamens 4, didynamous; anthers ovate, not appendaged, the sacs nearly parallel. Ovary 2-celled; ovules 1 in each cavity; style short; stigma oblique or recurved. Fruit dry, with a membranous exocarp, at length separating into 2 nutlets. [Named in honor of Auguste Lippi, 1678-1703, a French naturalist.] Perhaps 100 species, most abundant in tropical America. Type species: *Lippia americana* L.

Erect shrubs.

Leaves 2-7 cm. long, finely crenate.

Leaves 12 mm. long or less, crenate.

Herbaceous, with trailing or ascending stems, sometimes somewhat woody.

Trailing, herbaceous; leaves obovate to spatulate.

Leaves faintly veined.

Leaves strongly veined.

Ascending, somewhat woody; leaves linear-lanceolate.

1. *L. alba*.

2. *L. Helleri*.

3. *L. nodiflora*.

4. *L. reptans*.

5. *L. stoechadifolia*.

1. **Lippia alba** (Mill.) N. E. Brown.

Lantana alba Mill. Gard. Dict. ed. 8. 1768.

Lippia geminata H.B.K. Nov. Gen. 2: 266. 1818.

Lippia geminata microphylla Griseb. Fl. Br. W. I. 495. 1861.

Lippia lantanoides Coult. Contr. U. S. Nat. Herb. 2: 328. 1892.

An aromatic, densely puberulent shrub 1 m. high or less, usually much branched, the branches slender. Leaves ovate or oblong, 2-7 cm. long, acute or obtuse at the apex, narrowed at the base, crenate or crenulate, puberulent, rugose above, the petioles 3-8 mm. long; peduncles axillary, mostly much shorter than the leaves; heads subglobose, or short-oblong, 8-12 mm. long; bracts ovate, puberulent, acute, about 3 mm. long, nearly as long as the corolla; calyx 2-toothed; corolla purple, violet or white, its tube 4-5 mm. long, about 3 times as long as the calyx.

Thickets at lower elevations, Porto Rico; Vieques:—Bahamas (according to Grisebach); Jamaica; Cuba; Hispaniola; Antigua; Guadeloupe; Martinique; Trinidad; Margarita; continental tropical America. Sometimes cultivated. POLEY.

2. **Lippia Helleri** Britton, Torrey 3: 105. 1903.

A shrub, 1-2 m. high, the very slender branches pubescent. Leaves obovate, 6-12 mm. long, puberulent and resinous-dotted, crenate, the apex obtuse or rounded, the base narrowed or cuneate, the slender petioles 1.5-3 mm. long; heads axillary, several-flowered, about 8 mm. broad, on slender puberulent petioles 3-6 mm. long; bracts broadly oblong, obtuse, densely puberulent, 2-3 mm. long; flowers white, tinged with purple; calyx 2-toothed, pubescent, corolla-tube

about 4 mm. long, 3-4 times as long as the calyx. [*L. cuneifolia* of Sessé & Moçino not of Steudel; *L. micromera* of Urban, not of Schauer.]

Hillsides and thickets at lower and middle elevations, Porto Rico. Cultivated for its aromatic foliage. Apparently endemic. OREGANO. MEJORANA.

Lippia micromera Schauer, of northern South America, recorded as cultivated in Porto Rico, has narrower, nearly or quite entire leaves with revolute margins.

3. ***Lippia nodiflora*** (L.) Michx. Fl. Bor. Am. 2: 15. 1803.

Verbena nodiflora L. Sp. Pl. 20. 1753.

Phyla nodiflora Greene, Pittonia 4: 46. 1899.

Minutely and rather densely puberulent, herbaceous, creeping, or the branches ascending, 3-9 dm. long. Leaves thickish, spatulate, oblanceolate, or obovate, 1-6 cm. long, 0.6-2.5 cm. wide, inconspicuously veined, mostly obtuse, narrowed into a cuneate entire base, sharply serrate above the middle; petioles 2-8 mm. long, peduncles mostly much longer than the leaves; heads at length cylindric and 1-2.5 cm. long; corolla purple to white, little longer than the bracts.

Fields, hillsides and thickets, Porto Rico, at lower elevations; St. Thomas:—southeastern United States; Bermuda; Jamaica; Cuba; Cayman Islands; Hispaniola; Guadeloupe; Martinique; warm-temperate and tropical parts of the Old World. CIDRON. CAPE-WEED.

4. ***Lippia reptans*** H.B.K. Nov. Gen. 2: 263. 1818.

Lippia nodiflora reptans Kuntze, Rev. Gen. Pl. 508. 1891.

Similar to *L. nodiflora*, densely appressed-strigillose, herbaceous, creeping, prostrate or ascending, 2-5 dm. long. Leaves obovate, 2-6 dm. long, obtuse or acutish at the apex, cuneate at the base, coarsely and sharply dentate above the base, usually prominently veined, the petioles 5-10 mm. long; peduncles mostly longer than the leaves; heads ovoid, becoming subcylindric and 2 cm. long or less; corolla white. [*L. nodiflora* of Eggers and of Millspaugh.]

Banks, hillsides and plains at low elevations near the southern coast of Porto Rico; St. Croix:—West Indies; continental tropical America.

5. ***Lippia stoechadifolia*** (L.) H.B.K. Nov. Gen. 2: 265. 1818.

Verbena stoechadifolia L. Sp. Pl. 19. 1753.

Phyla stoechadifolia Small, Bull. N. Y. Bot. Gard. 36: 162. 1909.

Shrubby, loosely appressed-strigose, ascending or suberect, usually little branched, 2-4 dm. high. Leaves linear-lanceolate or oblong-lanceolate, rather firm in texture, 2.5-6 cm. long, strongly pinnately veined, sharply and evenly serrate, acute at the apex, narrowed into short petioles; peduncles axillary or lateral, mostly longer than the leaves; heads at first subglobose, at length oblong-cylindric, 1-2 cm. long, obtuse; bracts suborbicular, mucronate; calyx 2-toothed, compressed; corolla about 4 mm. long, longer than the bracts, its tube twice as long as the calyx.

Marshy borders of Lake Guanica, Porto Rico:—Florida; Bahamas; Jamaica; Cuba; Hispaniola; Guadeloupe; continental tropical America. Occasionally grown as a medicinal herb in Porto Rico.

6. **BOUCHEA** Cham. Linnaea 7: 252. 1832.

Herbs or low shrubs, with opposite petioled toothed leaves, and small flowers in terminal bracted spikes or narrow racemes. Calyx tubular, 5-toothed, 5-ribbed, cylindric in fruit. Corolla-tube cylindric, slender, the limb obliquely

spreading, 5-cleft, the lobes nearly equal. Stamens 4, didynamous, borne on the corolla-tube at or above the middle; filaments short; anthers ovate. Ovary 2-celled; ovules 1 or 2 in each cavity, erect; style filiform, subclavate above. Fruit linear or oblong, dry, enclosed in the calyx, separating into 2 linear nutlets. [Commemorates P. C. Bouché and C. D. Bouché, German gardeners.] About 15 species of tropical and warm temperate regions. Type species: *Verbena Pseudogervao* St. Hil.

1. *Bouchea prismatica* (L.) Kuntze, Rev. Gen. Pl. 502. 1891.

Verbena prismatica L. Sp. Pl. 19. 1753.

Bouchea Ehrenbergii Cham. Linnaea 7: 253. 1832.

Annual, erect, simple or few-branched, finely pubescent, 2–5 dm. high, the branches ascending. Leaves ovate, slender-petioled, 2–6 cm. long, serrate all around, acute at the apex, obtuse or subtruncate at the base; racemes narrow, elongated, often 2 dm. long or longer; pedicels very short, about 1 mm. long, erect; calyx narrowly cylindric, appressed to the axis of the raceme, about 10 mm. long, its teeth linear-subulate, about one-third as long as the tube; corolla violet or purplish, about 10 mm. long; fruit a little longer than the calyx.

Hillsides, fields and waste grounds at lower elevations, Porto Rico; Culebra; St. Croix; St. Thomas:—Bahamas; Jamaica; Cuba; Saba; St. Eustatius; Antigua; Barbados; Margarita; Curaçao; continental tropical America.

7. **VALERIANOIDES** [Boerh.] Medic. Phil. Bot. 1: 177. 1789.

Annual or perennial herbs, or shrubs. Leaves opposite or alternate, toothed. Flowers spicate, solitary and sessile in the axils of bracts, or imbedded in furrows of the rachis. Calyx membranous or herbaceous, its lobes 5, usually unchanged at maturity. Corolla-tube sometimes slightly dilated above, the limb spreading, 5-lobed. Stamens 2, included; anthers with unappendaged connectives; staminodia 2, small. Ovary 2-celled. Ovules solitary in each cavity. Fruit included in the calyx, separating into 2 nutlets. [Signifies similarity to *Valeriana*, but this is obscure.] More than 40 species, of tropical and subtropical America, known as BRETONICA, VERBENA or VERVAIN. Type species: *Verbena jamaicensis* L.

Shrub; furrows as broad as the slender rachis.
Herbaceous; furrows narrower than the rachis.
Glabrous or puberulent.
Pilose-pubescent.

1. *V. cayennense*.
2. *V. jamaicense*.
3. *V. strigosum*.

1. *Valerianoides cayennense* (L. C. Rich.) Kuntze Rev. Gen. Pl. 510. 1891.

Verbena cayennensis L. C. Rich. Act. Soc. Hist. Nat. Paris 1: 105. 1792.

Stachytarpheta cayennensis Vahl, Enum. 1: 208. 1804.

A shrub, 1–2.5 m. high, much-branched, the branches loosely pilose or glabrate. Leaves opposite, ovate to elliptic, serrate or cuneate-serrate, 3–7 cm. long, scabrate above, sparingly pubescent on the veins beneath, the apex obtuse or rounded, the base narrowed or obtuse and more or less decurrent on the petiole; spikes about 2.5 dm. long or shorter, slender, the furrows about as broad as the rachis; bracts narrowly linear, setaceous-acuminate; calyx about 4 mm. long; corolla pale blue or white, about 5 mm. broad.

Banks, hillsides and along rivers at lower elevations, Porto Rico, occasionally planted for ornament:—Jamaica; Hispaniola; St. Kitts to Barbados and Trinidad; South America. Recorded by Krebs from St. Thomas. A plant with fasciated spikes was observed at Dorado, Porto Rico.

2. *Valerianoides jamaicense* (L.) Kuntze, Rev. Gen. Pl. 509. 1891.

Verbena jamaicensis L. Sp. Pl. 19. 1753.

Stachytarpheta jamaicensis Vahl, Enum. 1: 206. 1805.

Abena jamaicensis Hitchc. Rep. Mo. Bot. Gard. 4: 117. 1893.

Herbaceous, often purplish, 6–12 dm. high, sparingly pubescent or glabrate. Leaves alternate or opposite, oblong, ovate or oval, 2–8 cm. long, coarsely serrate, narrowed at the base, the petioles margined, as long as the blades or shorter; spikes stiff, often flexuous, 1.5–5 dm. long; the furrows narrower than the rachis; bracts lanceolate to oblong-lanceolate, acuminate, 5–8 mm. long; calyx-teeth triangular or triangular-ovate; corolla blue, 8–11 mm. long, its tube slightly curved, the limb about 8 mm. broad.

Banks, fields and thickets, Porto Rico, at lower and middle elevations; Culebrita; Vieques; St. Croix; Mona; Muertos; Culebra; St. Thomas; St. Jan; Tortola:—Florida; Bermuda; West Indies; tropical continental America and Old World tropics.

3. *Valerianoides strigosum* (Vahl) Britton.

Stachytarpheta strigosa Vahl, Enum. 1: 207. 1804.

V. jamaicense forma *strigosum* Kuntze, Rev. Gen. Pl. 510. 1891.

Herbaceous; stems densely pilose, rather stout, branched or simple, 3–6 dm. high. Leaves ovate to elliptic, 3–8 cm. long, pilose on both sides, crenate-serrate, the base narrowed and decurrent on the petiole; spikes rather stout, about 3 dm. long or shorter, somewhat curved, the furrows narrower than the rachis; bracts lanceolate, acuminate, pilose; corolla pale bluish-purple, its limb about 6 mm. broad.

Banks and hillsides, Porto Rico, at lower and middle elevations; Mona; St. Thomas; St. Jan; Tortola:—Hispaniola; Antigua; recorded from St. Vincent and Trinidad.

8. **PRIVA** Adans. Fam. Pl. 2: 505. 1763.

Perennial or annual caulescent herbs. Leaves opposite, membranous, toothed, the flowers in slender peduncled racemes. Calyx-tube 5-ribbed; lobes 5. Corolla salverform, its tube straight or incurved, slightly dilated above, its limb spreading, oblique, slightly 2-lipped, with 5 short lobes. Stamens 4, didynamous, included; anthers with parallel or slightly divergent sacs. Ovary 2-celled, each cavity with more or less well-developed septa. Ovules 2, or by abortion 1, at base of each cavity. Fruit enclosed in the calyx, separating into 2 often prickly or muricate nutlets. [Name unexplained.] About 10 species, of tropical distribution. Type species: *Verbena lappulacea* L.

Wholly herbaceous; corolla 4 mm. long; leaves 2–10 cm. long.
Woody below; corolla 6 mm. long; leaves 3 cm. long or less.

1. *P. lappulacea*.
2. *P. portoricensis*.

1. *Priva lappulacea* (L.) Pers. Syn. 2: 139. 1806.

Verbena lappulacea L. Sp. Pl. 19. 1753.

Priva echinata Juss. Ann. Mus. Par. 7: 69. 1806.

Herbaceous, annual, more or less pubescent. Stems 2–6 dm. tall, branching; leaves ovate, 2–10 cm. long, acute or acuminate, serrate, truncate or cordate at the base, the petioles much shorter than the blades; racemes loosely flowered, 5–15 cm. long; pedicels 1–2 mm. long; calyx cylindric-prismatic, 2–3 mm. long, accrescent, pubescent; corolla slightly surpassing the calyx, salverform, with short rounded lobes; fruiting calyx ovoid-pyramidal, 5–7 mm. long; nutlets 2-seeded, spiny-tuberculate on the back. [*Verbena mexicana* of West.]

Banks, waste and cultivated grounds, Porto Rico, at lower and middle elevations; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Florida; Bermuda; West Indies; continental tropical America. BUR-VERVAIN.

2. *Priva portoricensis* Urban, Symb. Ant. 4: 534. 1911.

Somewhat woody below, annual, pilose at the nodes, 3–4 dm. high. Leaves triangular or ovate 0.5–3 cm. long, short-pilose above, crenate, the apex acute or obtuse, the base subtruncate, the petioles 2–12 mm. long; racemes 25 cm. long or shorter; pedicels 1–1.5 mm. long; calyx about 5 mm. long, densely pilose; corolla pale blue, its tube 6 mm. long, its lobes rounded or obovate; fruiting calyx subglobose; nutlets excavated on the inner face, 1-seeded, the prickles on the dorsal face in 2 rows.

Thickets and woods near Guanica, Porto Rico, collected only by Sintenis. Endemic.

Priva mexicana (L.) Pers., a Mexican species, was recorded by Krebs from St. Thomas, doubtless erroneously.

9. *CITHAREXYLUM* L. Sp. Pl. 625. 1753.

Trees or shrubs, with alternate leaves and small flowers in terminal or axillary spikes or racemes, the pedicels subtended by minute bracts. Calyx narrowly campanulate, minutely 5-lobed, persistent. Corolla salverform, its limb slightly oblique, 5-lobed. Stamens 4 or 5, adnate to the corolla-tube, the fifth one mostly sterile or rudimentary; filaments filiform. Ovary sessile, incompletely 4-celled; ovules solitary, anatropous; stigma 2-lobed. Drupes berry-like, the fleshy pulp enclosing a bony stone which separates into 2, 2-seeded nutlets (pyrenes). [Greek, fiddle-wood; French, bois fidèle.] About 20 species, of tropical America. Known as FIDDLE-WOOD. Type species: *Citharexylum spinosum* L.

Pyrenes 1-celled; flowering pedicels 2 mm. long; leaves coarsely reticulate-veined.

Pyrenes 2-celled; flowering pedicels less than 2 mm. long; leaves densely reticulate-veined.

Flowering pedicels less than 1 mm. long; drupe subglobose.

Flowering pedicels 1–1.5 mm. long; drupe obovoid-oblong.

1. *C. caudatum*.

2. *C. fruticosum*.

3. *C. spinosum*.

1. *Citharexylum caudatum* L. Sp. Pl. ed. 2, 872. 1763.

Citharexylum Berterii Spreng. Syst. 2: 763. 1825.

Citharexylum lucidum Cham. Linnaea 5: 97. 1830.

Citharexylum surrectum Griseb. Fl. Br. W. I. 497. 1861.

A shrub, or a tree up to 20 m. high, the nearly terete, slender twigs glabrous. Leaves oblong, rather thin, 7–15 cm. long, mostly obtuse at the apex, narrowed at the base, shining above, dull beneath, the petioles 1–2 cm. long; racemes narrow, elongated, 4–8 dm. long; pedicels 2–3 mm. long; calyx campanulate, about 3 mm. long, nearly truncate; corolla white, its tube about twice as long as the calyx, its limb spreading, 4–5 mm. wide; drupe globose-oblong, black, shining, 2–3 times as long as the calyx; nutlets 1-celled.

Mountain forests at middle and higher elevations, Porto Rico;—Bahamas; Jamaica; Cuba; Hispaniola; Mexico. HIGUERILLO.

2. *Citharexylum fruticosum* L. Syst. ed. 10, 1115. 1759.

Citharexylum cinereum L. Sp. Pl. ed. 2, 872. 1763.

Citharexylum villosum Jacq. Icon. Rar. 1: 12. 1786.

Citharexylum subserratum Sw. Prodr. 91. 1788.

Citharexylum pentandrum Vent. Descr. Pl. Cels. 47. 1800.

Citharexylum bahamense Millsp. Bull. N. Y. Bot. Gard. 3: 450. 1905.

Citharexylum fruticosum villosum O. E. Schulz in Urban, Symb. Ant. 6: 63. 1909.

A tree, attaining a maximum height of about 10 m., with a trunk up to 2 dm. in diameter, the bark light brown, separating in strips when old, the twigs slender and angled, the foliage glabrous, pubescent or tomentose. Leaves oblong to obovate, various, 5–15 cm. long, 1–4 cm. wide, acute, obtuse or emarginate, narrowed at the base, densely reticulate-veined, shining above, dull beneath, entire, or those of shoots coarsely serrate, the petioles 2.5 cm. long or less; racemes slender, spike-like, 5–12 cm. long; pedicels 1 mm. long or less; calyx narrowly campanulate, about 3 mm. long; corolla white, its tube somewhat longer than the calyx, its spreading limb about 6 mm. wide; drupe subglobose, 6–10 mm. in diameter, reddish brown to black; nutlets 2-celled. [*C. quadrangulare* of Bello, of Stahl and of Cook and Collins, not of Linnaeus.]

Woods, hillsides and thickets, Porto Rico, at lower and middle elevations; Desecheo; Icacos; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda; Anegada;—Florida; Bahamas; West Indies, south to Guadeloupe and Dominica. The leaves are glabrous or nearly so in wet or moist districts, pubescent or tomentose in dry regions. Its red wood is hard and strong, with specific gravity of about 0.87, used for furniture and in construction. Reference to the original description of *C. pentandrum* by Ventenat, shows that the corolla is described as glabrous on the outside, not tomentose or pilose as stated by Schulz (Urban, Symb. Ant. 6: 56, 57). Leaves of young plants of *C. fruticosum* at Hato Arriba, near Arecibo, Porto Rico, are coarsely serrate, quite like those of *C. pentandrum* as illustrated by Ventenat. PENDULA. PALO DE GUITTARA. OLD WOMAN'S BITTER.

3. *Citharexylum spinosum* L. Sp. Pl. 625. 1753.

Citharexylum quadrangulare Jacq. Enum. 26. 1760.

A tree, 8–20 m. high, the trunk up to about 1 m. in diameter, the glabrous twigs 4-angled. Leaves elliptic or oblong-elliptic, rather thin, glabrous, densely reticulate-veined, 7–20 cm. long, entire, or some of them on shoots, coarsely serrate, the apex acute or acuminate, the base narrowed, the slender petioles 1–3 cm. long; racemes slender, 2 dm. long or shorter; flowers fragrant, white; pedicels 1–1.5 mm. long; calyx about 2 mm. long, narrowed below; corolla glabrous without, about 8 mm. long, its lobes nearly orbicular; drupe obovoid-oblong, about 10 mm. long, black, shining; nutlets 2-celled.

Forests and slopes, St. Croix; St. Thomas; planted for shade in the Virgin Islands:—Saba to Trinidad and northern South America. The specific name *spinosum* is misleading, as the tree is not spiny in any way. SUSANNA.

10. *DURANTA* L. Sp. Pl. 637. 1753.

Shrubs or small trees, the branches sometimes spiny. Leaves opposite or whorled, entire or toothed. Flowers small, in terminal or axillary racemes. Calyx-tube campanulate or tubular, truncate or minutely 5-lobed. Corolla funnelform or salverform, its tube cylindric, straight or incurved, its limb spreading, oblique or of 5 equal lobes. Stamens 4, didynamous, included; anthers with unappendaged connectives, the sacs distinct. Ovary partially or imperfectly 8-celled. Stigma oblique, sometimes unequally 4-lobed. Ovules solitary or 2 in each cavity. Drupe included in the calyx, containing 4 nutlets. Seeds without endosperm. [In honor of Castor Durante, a physician of Rome.] About 8 species of tropical America, the following typical.

1. *Duranta repens* L. Sp. Pl. 637. 1753.

Duranta Ellisia Jacq. Enum. 26. 1760.

Duranta Plumieri Jacq. Select. Am. 186. 1763.

A shrub or small tree reaching a height of 6 m., with glabrate or finely pubescent foliage, and unarmed or spiny, slender, often drooping or trailing branches. Leaves numerous, ovate-elliptic, oval or obovate, 1.5–5 cm. long, obtuse or

apiculate, entire or serrate above the middle, short-petioled; racemes 5–15 cm. long, recurving; pedicels 1–5 mm. long; calyx 3–4 mm. long, angled, its lobes acute, shorter than the tube; corolla lilac, the tube surpassing the calyx, the limb 7–9 mm. broad; fruit yellow, globular, 7–11 mm. in diameter, enclosed by the accrescent yellowish calyx which is produced into a curved beak.

Hillsides and thickets at lower and middle elevations, Porto Rico; Vieques; Desecheo; Muertos; St. Croix; St. Thomas; St. Jan; Virgin Gorda:—Florida; Bermuda; West Indies; continental tropical America. Often planted for ornament. LILA. LLUVIA. CUENTA DE ORO. PIGEON-BERRY.

11. **CALLICARPA** L. Sp. Pl. 111. 1753.

Shrubs or trees, with opposite leaves, and small blue-purple or white flowers in axillary cymes. Calyx short, campanulate, 4-toothed (rarely 5-toothed), or truncate. Corolla-tube short, expanded above, the limb 4-cleft (rarely 5-cleft), the lobes equal. Stamens 4, equal, exserted; anther-sacs parallel. Ovary incompletely 2-celled; ovules 2 in each cavity, laterally attached, amphitropous; style slender; stigma-lobes 2, subtruncate. Fruit a berry-like drupe, much longer than the calyx, containing 1–4 nutlets. [Greek, handsome fruit.] About 35 species of Asia, Africa and America. Type species: *Callicarpa americana* L.

1. **Callicarpa ampla** Schauer, in DC. Prodr. 11: 642. 1747.

A tree, 6–15 m. high, or shrubby, the twigs and inflorescence densely white-scurfy. Leaves elliptic to oblong-elliptic, subcoriaceous, 10–25 cm. long, shining above, densely white-scurfy and reticulate-veined beneath, the apex acute or acuminate, the base narrowed, the stout petioles 2–3 cm. long, the margin entire or undulate; cymes large, corymbose; peduncles longer than the petioles; flowers white, nearly sessile; calyx about 2 mm. long, subtruncate; corolla-tube about as long as the calyx, its lobes rounded; stamens long-exserted, the anthers yellow.

Woods and thickets in wet or moist parts of the central districts of Porto Rico, ascending to higher elevations. Endemic. CAPA ROSA.

Callicarpa reticulata Sw., a little known species of Jamaica, was recorded by West from St. Croix many years ago; the record has not been substantiated.

12. **AEGIPHILA** Jacq. Obs. 2: 3. 1767.

Shrubs or trees, with opposite entire leaves, and small flowers in axillary or terminal, usually paniced, cymes. Calyx nearly truncate, 4-toothed or rarely 5-toothed, enlarged in fruit. Corolla-tube cylindric or expanded above, the limb 4-lobed, rarely 5-lobed, the lobes equal. Stamens 4, rarely 5; anther-sacs parallel. Ovary incompletely 4-celled; ovules 1 in each cavity; stigma-lobes 2, filiform. Fruit a small drupe containing 1–4 nutlets. [Greek, goat's friend.] About 30 species of tropical America, the following typical.

1. **Aegiphila martinicensis** Jacq. Obs. 2: 3. 1767.

A shrub, 1–3 m. high, or a slender tree about 5 m. high, the young twigs and the inflorescence finely strigose-puberulent, the branches glabrous; leaves oblong-lanceolate to ovate-elliptic, thin, glabrous, 4–20 cm. long, the apex acuminate, the base narrowed or obtuse, the slender petioles about 15 mm. long or shorter; cymes forming terminal many-flowered panicles and often also axillary; bracts linear, short; pedicels very slender, 2–4 mm. long; flowering calyx narrowly campanulate, about 2 mm. long, its teeth very short; corolla white or pale yellow,

its tube 4–5 mm. long, its limb about 3 mm. broad, the lobes obtuse; drupes orange, subglobose, 8–10 mm. in diameter.

Woods and thickets at lower and middle elevations in moist parts of the eastern and central districts of Porto Rico; St. Croix; St. Thomas;—Jamaica; Cuba; Cayman Islands; St. Eustatius to Trinidad; continental tropical America. CAPAILLO.

Aegiphila trifida Sw., recorded by Krebs as found in St. Thomas, is endemic in Jamaica.

13. *PETITIA* Jacq. Enum. 1, 12. 1760.

Trees or shrubs, with large opposite entire petioled tomentulose leaves, and small axillary cymose-paniculate flowers. Calyx campanulate, 4-toothed or subtruncate. Corolla short-salverform, the limb spreading, 4-cleft, the lobes imbricated, equal. Stamens 4, borne near the top of the corolla-tube, equal; filaments very short; anthers ovate. Ovary 2-celled; ovules 2 in each cavity; style 2-cleft at the apex. Fruit a small drupe, the endocarp 2–4-celled. [Commemorates François Petit, 1664–1741, a French physician.] Two or three species of the West Indies and Mexico, the following typical.

1. *Petitia domingensis* Jacq. Enum. 12. 1760.

Petitia Poeppigii Schauer, in DC. Prodr. 11: 639. 1847.

A tree, up to 22 m. high, usually much smaller or sometimes a shrub, the slender twigs, the petioles and the inflorescence densely brownish-tomentulose, the bark separating in strips. Leaves elliptic-oblong or elliptic-lanceolate, 7–15 cm. long, rather thin, acute or acuminate at the apex, obtuse or rounded at the base, dark green, dull and glabrous or nearly so above, rusty-tomentulose beneath, the slender petioles 7 cm. long or less; panicles many-flowered, as long as the leaves or shorter; calyx about 1.5 mm. long; corolla whitish, its tube about twice as long as the calyx, its limb 4–5 mm. broad; flowers fragrant; drupes nearly black, globose to obovoid, 4–5 mm. in diameter.

Woods and hillsides, Porto Rico, at lower and middle elevations in moist districts; St. Croix (according to Eggers);—Bahamas; Jamaica; Cuba; Cayman Islands; Hispaniola. The brown wood, used for rollers, for furniture and in construction, is hard and heavy. CAPA AMARILLO. BASTARD STOPPER.

14. *CORNUTIA* [Plumier] L. Sp. Pl. 628. 1753.

Shrubs or small trees, with 4-angled twigs, broad opposite tomentulose or pubescent leaves, and small blue or violet irregular flowers in terminal paniced cymes. Calyx small, campanulate, the 4 or 5 teeth short. Corolla-tube cylindric, slender, the limb spreading, 2-lipped, the upper lip entire, the lower 3-lobed, the lobes valvate. Perfect stamens 2; anther-sacs ovoid; staminodia 2, filiform. Ovary 4-celled, villous; ovules 1 in each cavity. Style with 2 short unequal lobes. Fruit a small globose drupe, the stone 4-celled. [Commemorates Jacques Phillipe Cornutus, French physician and botanist, died in 1651.] A few species, natives of tropical America. Type species: *Cornutia pyramidata* L.

Leaves ovate to elliptic, acute or acuminate, whitish-pubescent

beneath.
Leaves obovate, cuneate, obtuse, yellowish-pubescent beneath.

1. *C. pyramidata*.
2. *C. obovata*.

1. *Cornutia pyramidata* L. Sp. Pl. 628. 1753.

A shrub, 2–4 m. high, rarely a small tree up to about 6 m. high, the twigs and inflorescence densely whitish-tomentulose. Leaves ovate to elliptic, char-

taceous, entire, 4–12 cm. long, the apex acute or short-acuminate, the base narrowed or cuneate, the upper surface pubescent or glabrate, the under surface densely whitish-tomentulose, the petioles about 1.5 cm. long or shorter; panicles many-flowered, narrow, 6–15 cm. long; flowers short-pedicelled; calyx tomentulose, about 2 mm. long, subtruncate; corolla blue, tomentulose, its tube about 7 mm. long, its limb 4–5 mm. broad; drupes puberulent, about 3 mm. in diameter.

Woods on the Rio Blanco near Naguabo, Porto Rico, collected only by Eggers:—Cuba; Hispaniola; Guadeloupe to Grenada; Central America.

2. *Cornutia obovata* Urban, Symb. Ant. 1: 395. 1899.

A tree, about 10 m. high, the twigs and panicles short-pilose. Leaves obovate, or orbicular-obovate, subcoriaceous, 6–15 cm. long, rounded or subtruncate at the apex, cuneate at the base, sparingly short-pilose above, densely yellowish-tomentulose beneath, the petioles 1–2 cm. long; panicles oblong, 12 cm. long or longer, pedicels 1–3 mm. long; fruiting calyx 4–5 mm. broad; drupes violet, 4–5 mm. long, globose-obovoid, tomentulose.

Primaeval forest on Monte Torrecillo, near Barranquitas, Porto Rico, collected only by Sintenis in 1885. This species was not seen by us during two days' study of the Monte Torrecillo forest in 1915; this forest has been much reduced in area in recent years.

15. *VITEX* L. Sp. Pl. 638. 1753.

Trees or shrubs, with opposite, digitately compound leaves (rarely unifoliate), the flowers in paniced cymes. Calyx small, mostly campanulate and 5-toothed. Corolla with a cylindric tube and a spreading, somewhat 2-lipped, 5-cleft limb. Stamens 4, didynamous, exserted. Ovary mostly 4-celled with one ovule in each cavity; style 2-cleft. Drupe small, the stone 4-celled. [Ancient Latin name.] About 60 species, mostly natives of tropical regions, a few in the temperate zones. Type species: *Vitex Agnus-castus* L.

1. *Vitex divaricata* Sw. Prodr. 93. 1788.

A tree, with maximum height of about 20 m., the bark separating in strips, the twigs and inflorescence puberulent or glabrate. Leaves 3-foliolate or some of them 1-foliolate, slender-petioled, deciduous, glabrous, or puberulent beneath; leaflets elliptic to ovate or oblong-elliptic, thin, entire, 5–15 cm. long, the apex acuminate or acute, the base narrowed or rounded, the petiolules short; panicles axillary, several-many-flowered, pedicels short; calyx about 2 mm. long, subtruncate; corolla violet or blue, densely puberulent, its tube 5–6 mm. long, its limb about as broad; drupes obovoid-ellipsoid, smooth, black, 8–10 mm. long.

Woods, in wet or moist districts, Porto Rico, ascending to higher elevations; St. Croix; St. Thomas; St. Jan.:—Cuba; St. Kitts and Guadeloupe to Trinidad; recorded from Guiana. The nearly white wood, used in cabinet work and in construction, is hard and durable, with specific gravity of about 0.75. HIGUERILLO. PENDULO BLANCO.

Vitex Agnus-castus L., CHASTE-TREE, European, planted for ornament, at least formerly, in Virgin Island gardens, is a tall shrub with palmately compound, opposite petioled leaves, their 5 or 7 leaflets narrowly lanceolate, acuminate, 7–10 cm. long, dark green above, white-puberulent beneath; the small blue or white flowers are in narrow terminal panicles, the corolla about 8 mm. long.

Vitex Negundo L., of tropical Asia, was listed by Krebs as grown in St. Thomas prior to 1851.

16. **VOLKAMERIA** L. Sp. Pl. 637. 1753.

A vine-like spiny shrub, with opposite petioled entire leaves, and white flowers in axillary cymes. Calyx campanulate, 5-toothed. Corolla salverform, with a slender tube, the limb 5-lobed. Stamens 4, exserted, somewhat unequal. Style filiform. Stigma 2-lobed. Fruit a subglobose drupe, the nutlets united in pairs. [In honor of J. C. Volkamer, Nuremberg botanist, who died in 1720.] Only the following species, native of tropical America.

1. **Volkameria aculeata** L. Sp. Pl. 637. 1753.

Clerodendron aculeatum Griseb. Fl. Br. W. I. 500. 1861.

Ovieda aculeata Baillon, Hist. Pl. 11: 95. 1892.

Climbing to a length of 3 m. or more, or nearly erect, the slender branches densely puberulent, armed with stout opposite spreading spines 8 mm. long or less. Leaves thin, slender-petioled, oblong to elliptic-obovate, obtuse or acute at the apex, narrowed to the base, 2–5 cm. long; cymes stalked, few-several-flowered; pedicels slender, puberulent, 6–14 mm. long; calyx about 3 mm. long, puberulent, its teeth triangular-ovate, acute; tube of the corolla about 18 mm. long, its limb about 12 mm. broad; stamens purple; drupe 4-grooved, 6–8 mm. in diameter. [? *Clerodendron longicollis* of Borgesen & Paulsen.]

Coastal thickets and hillsides, Porto Rico; Icacos; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda; Anegada:—Inagua; West Indies south to Barbados; continental tropical America; naturalized in Bermuda. BOTON DE ORO. ESCAMBRON BLANCO. PRICKLY MYRTLE. CRAB PRICKLE.

17. **CLERODENDRUM** [Burm.] L. Sp. Pl. 637. 1753.

Shrubs, vines or perennial herbs, with opposite entire leaves, and large flowers in terminal or axillary cymes or panicles. Calyx 5-toothed or 5-lobed. Corolla salverform or funnelform, the tube mostly longer than the 5-lobed limb. Stamens 4, borne on the corolla-tube, exserted, somewhat unequal. Stigma 2-lobed; ovary 4-celled. Fruit a drupe, enclosing 4, 1-seeded nutlets. [Greek, tree of fortune.] Probably 100 or more species, mostly natives of tropical regions. Type species: *Clerodendrum infortunatum* L.

1. **Clerodendrum fragrans** Vent. Jard. Malm. pl. 70. 1804.

Ovieda fragrans Hitchc. Rep. Mo. Bot. Gard. 4: 118. 1893.

Half-shrubby, finely pubescent, 6–15 dm. high, the stout branches angled. Leaves very broadly ovate, 1–2 dm. long, acute at the apex, cordate or nearly truncate at the base; coarsely dentate, long-petioled; flowers white, fragrant, in dense terminal cymes, the corolla about 2.5 cm. broad; calyx 5-cleft, its lanceolate lobes acuminate; corolla-lobes rounded. [*C. fragrans pleniflora* Schauer.]

Roadsides and waste grounds, Porto Rico, escaped from cultivation at lower and middle altitudes; St. Thomas:—Florida; Bermuda; widely distributed in the West Indies. Native of the Old World tropics. Only the double-flowered race is known in Porto Rico, originally planted for ornament. FLOR DE MUERTO. JASMIN HEDIONDO. WILD JESSAMINE.

Clerodendrum speciosissimum Paxt., SANTO DOMINGO, Malayan, grown for ornament in Porto Rico gardens, is shrubby, 1–1.5 m. high, with large orbicular-ovate, cordate-petioled, pubescent, dentate or entire leaves 1.5–3 dm. broad, the numerous scarlet flowers paniced. [*C. fallax* Lindl.]

Clerodendrum Thompsonae Balfour [*C. Balfouri* of gardeners], of western tropical Africa, occasionally grown for ornament in Virgin Island gardens

under the name **DANISH FLAG**, is an evergreen vine with thin, ovate-elliptic, acuminate petioled leaves 5–10 cm. long, its showy flowers in terminal panicles, the white 5-angled calyx 1–1.5 cm. long, the corolla about 2.5 cm. long, its spreading limb crimson.

18. SIPHONANTHUS L. Sp. Pl. 109. 1753.

A tall erect glabrous virgate shrub, with verticillate, oblong-lanceolate, entire short-petioled leaves, and long white flowers in axillary cymes and forming a large terminal panicle. Calyx deeply 5-parted, somewhat fleshy, its broad lobes ovate. Corolla-tube very slender, greatly elongated, expanded at the top, curved, the limb somewhat irregularly 5-lobed, very much shorter than the limb. Stamens 4, unequal, exserted. Stigma 2-cleft. Drupe globose, fleshy, shorter than the persistent calyx-lobes, 2–4-lobed, usually with 4 nutlets. [Greek, referring to the long corolla-tube.] A monotypic genus.

1. Siphonanthus indicus L. Sp. Pl. 109. 1753.

Clerodendron Siphonanthus R. Br. in Ait. Hort. Kew, ed. 2, 4: 65. 1812.

Stem rather stout, simple or little branched, about 2 m. high or less, angled and grooved. Leaves, thin, 6–15 cm. long, the apex acuminate, the base narrowed, the petioles only about 8 mm. long or shorter; calyx-lobes purplish, 6–10 mm. long, acute, rather longer than the broadly campanulate tube; corolla-tube about 10 cm. long and only 2 mm. thick, the limb 2–3 cm. broad, its lobes oblong and obovate; drupes blue-black, 8–10 mm. broad.

Rocky woods, St. Croix, apparently naturalized after planting for ornament:—southern United States; Antigua to Trinidad. Native of the East Indies. **TURK'S-TURBINE**.

19. AVICENNIA L. Sp. Pl. 110. 1753.

Evergreen trees, sometimes shrubby, with nodose twigs, opposite entire leathery leaves without stipules, and peduncled panicles of white bracted flowers. Calyx cup-shaped, silky, with 5 persistent lobes. Corolla campanulate, its short tube nearly cylindric, its limb spreading, 4-lobed. Stamens 4, adnate to the corolla-tube, the anthers introrse. Ovary sessile, 1-celled; ovules 4, on a central placenta; style short, 2-lobed. Fruit capsular, oblique, apiculate. Seeds pendulous, without endosperm, usually germinating in the capsule. [In honor of Avicenna (980–1036) of Bokhara, a distinguished oriental physician.] Three known species of tropical and subtropical seacoasts. Type species: *Avicennia officinalis* L.

1. Avicennia nitida Jacq. Enum. 25. 1760.

Avicennia tomentosa Jacq. Enum. 25. 1760.

A. officinalis nitida Kuntze, Rev. Gen. Pl. 502. 1891.

A tree, up to about 16 m. high, with shallowly-fissured dark scaly bark, orange-red within, the young twigs finely pubescent. Leaves pubescent when young, soon becoming glabrous above, oblong or oblong-lanceolate, 3–8 cm. long, obtuse or apiculate at the apex, finely canescent beneath, narrowed at the base into short petioles; panicles 2–5 cm. long; corolla 10–14 mm. broad, its lobes rounded; capsule oblong or elliptic, 2–5 cm. long, light green, slightly pubescent.

Coastal lagoons and swamps, Porto Rico; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Florida to Texas; Bermuda; West Indies; tropical continental America and Old World tropics. The dark brown wood is hard and very durable with a specific gravity of about 0.9; it is used for sills, posts and drains. **MANGLE BOBO**. **BLACK MANGROVE**. **OLIVE MANGROVE**. **SALT POND**.

Petraea volubilis Jacq., PURPLE WREATH, South American, planted for ornament in Porto Rico and the Virgin Islands, is a woody vine, up to 5 m. long or longer, the leaves elliptic to obovate, entire, roughish, 7–10 cm. long, the showy purple or lilac flowers in long terminal racemes, with 5 linear-oblong blunt spreading persistent sepals, the shorter corolla funnelform.

Holmskioldia sanguinea Retz., Asiatic, occasionally planted for ornament in Porto Rico and Virgin Island gardens, is a somewhat pubescent shrub, with elongated, vine-like branches up to 5 m. long or longer, the thin ovate entire acuminate leaves 5–8 cm. long, the flowers in terminal racemes, with a widely expanded, nearly orbicular, thin calyx about 2 cm. in diameter and a red to orange, nearly cylindric corolla 2–2.5 cm. long, the fruit small, 4-lobed.

Tectona grandis L., TEAK, East Indian, experimentally planted in Porto Rico and St. Croix, becomes a large tree, its wood very valuable; the large leaves are oval, short-petioled, shining above, white-canescens beneath, the flowers in large terminal panicles, the small whitish corolla funnelform, the fruit a small drupe.

Family 7. **LAMIACEAE** Lindl.

MINT FAMILY.

Aromatic punctate herbs, or shrubs (a few tropical species trees), mostly with 4-sided stems and simple opposite leaves; stipules none. Flowers mostly irregular, perfect, clustered, the inflorescence various, usually bracteolate. Calyx inferior, persistent, 5-toothed or 5-lobed (rarely 4-toothed), mostly nerved. Corolla with a short or long tube, the limb 4–5-lobed, mostly 2-lipped, regular in a few genera; upper lip 2-lobed, or sometimes entire; lower lip mostly 3-lobed. Stamens borne on the corolla-tube, typically 4 and didynamous, sometimes 2, rarely equal; filaments separate, alternate with the corolla-lobes; anthers 2-celled, introrse, or confluent 1-celled, or sometimes of a single sac. Disk usually present, fleshy. Ovary 4-lobed, or 4-parted, superior, each lobe or division with 1 mostly anatropous ovule; style arising from the centre of the lobed or parted ovary, 2-lobed at the summit. Fruit of 4, 1-seeded nutlets. Seed erect (transverse in *Scutellaria*); endosperm scanty, or none; embryo mostly straight; radicle short, inferior. About 160 genera and 3,200 species, of wide distribution.

A. Calyx with a crest on the upper side; corolla 2-lipped; stamens ascending.

B. Calyx without a crest.

1. Stamens erect or ascending.

Corolla strongly 2-lipped.

Stamens 4.

Style-branches very unequal.

Upper lip of the corolla much longer than the lower.

Corolla-lips nearly equal.

Style-branches equal.

Stamens only 2.

Corolla very nearly regular.

2. Stamens declined.

Lower lip of the corolla deflexed, saccate.

Nutlets not winged.

Nutlets with a membranous fimbriate wing.

Lower lip of the corolla flat or concave.

Lower lip of the corolla elongated.

Corolla-lips nearly equal.

1. *Scutellaria*.

2. *Leonotis*.

3. *Leucas*.

4. *Leonurus*.

5. *Salvia*.

6. *Mentha*.

7. *Hyptis*.

8. *Marsippanthes*.

9. *Coleus*.

10. *Ocimum*.

1. **SCUTELLARIA** L. Sp. Pl. 598. 1753.

Bitter herbs, some shrubby. Flowers blue to violet, in bracted, mostly secund, spike-like racemes, or solitary or 2–3 together in the axils. Calyx cam-

panulate, gibbous, 2-lipped, the lips entire, the upper one with a crest or protuberance upon its back and often deciduous in fruit. Corolla recurved-ascending, dilated above into the throat, glabrous within, the limb 2-lipped; upper lip arched, entire or emarginate; lower lip spreading or deflexed, its lateral lobes small and somewhat connected with the upper, its middle lobe broad. Stamens 4, didynamous, all anther-bearing, ascending under the upper lip, the upper pair somewhat the shorter, their anthers 2-celled, ciliate; anthers of the lower pair of stamens 1-celled, also ciliate. Nutlets papillose or tuberculate. [Latin, a dish, from the appendage to the calyx.] About 100 species of wide distribution. Type species: *Scutellaria peregrina* L.

1. *Scutellaria havanensis* Jacq. Enum. 25. 1760.

Scutellaria cubensis A. Rich. in Sagra, Hist. Cub. 11: 158. 1850.

Scutellaria longiflora Small, Bull. N. Y. Bot. Gard. 3: 437. 1905.

Perennial; stems very slender, often branched near the base, erect or ascending, 3 dm. high or less, pubescent or puberulent. Leaves ovate or ovate-orbicular, short-petioled, 3–9 mm. long, puberulent on both sides, few-toothed or entire; flowers solitary in the axils on ascending peduncles 3–7 mm. long; flowering calyx about 1.5 mm. long; corolla dark blue, about 1.5 cm. long, the middle lobe of the upper lip emarginate, the lower lip 3-lobed; fruiting calyx about 3 mm. long. [*S. purpurascens* of Grisebach, not of Swartz.]

Rocks and cliffs at middle and higher elevations, eastern and central districts of Porto Rico;—Florida; Bahamas; Cuba; Hispaniola.

2. **LEONOTIS** R. Br. in Ait. Hort. Kew, ed. 2, 3: 409. 1811.

Annual or perennial caulescent herbs or shrubby plants, the leaves opposite, broad, toothed, petioled, the flowers in dense whorls, short-pedicelled. Calyx-tube 10-nerved, oblique at the mouth, its lobes 8–10, unequal, bristle-tipped. Corolla yellow, orange or scarlet, 2-lipped, the tube dilated above, curved; upper lip erect, rather long; lower lip with 3 lobes, the middle lobe scarcely longer than the lateral. Stamens 4, didynamous, ascending; filaments all anther-bearing; anthers 2-celled, their sacs diverging. Style-branches unequal. Nutlets 3-angled, smooth. [Greek, lion's ear.] About 12 species, natives of Africa. Type species: *Leonotis Leonitis* (L.) R. Br.

1. *Leonotis nepetaefolia* (L.) R. Br. in Ait. Hort. Kew, ed. 2, 3: 409. 1811.

Phlomis nepetaefolia L. Sp. Pl. 586. 1753.

Annual, softly pubescent. Stems 3–20 dm. tall, rather stout, simple or branched; leaves ovate to ovate-deltoid, 4–12 cm. long, coarsely crenate, cuneate or subcordate at the base; flower-clusters dense, 4–6 cm. in diameter; pedicels 1–2 mm. long; calyx puberulent, becoming about 2 cm. long, its tube reticulated above the middle, its lobes 8, awn-tipped; corolla scarlet or orange-yellow, 2–2.5 cm. long, villous-hirsute, its tube curved, the upper lip as long as the tube, the lower lip much shorter than the upper, with 3 narrow lobes; nutlets 3 mm. long, sharply angled.

Fields, cultivated grounds and river banks, Porto Rico, at lower elevations; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda;—southeastern United States; Bermuda; West Indies; tropical continental America and Old World tropics. Appearing in America as if introduced from the Old World. MOLINILLO. QUINA DEL PASTO, BOTON DE CADETA. LION'S-EAR.

3. **LEUCAS** [Burm.] R. Br. Prodr. 504. 1810.

Herbs, some Old World species shrubs, with opposite dentate leaves, the flowers in dense axillary verticillate clusters. Calyx tubular or tubular-campanulate, 10-nerved, 8–10-toothed. Corolla small, 2-lipped, the upper lip erect, concave, entire or emarginate, the lower one 3-cleft. Stamens 4, didynamous, ascending, the anthers approximate in pairs. Style-branches unequal. Nutlets 3-angled, smooth. [Greek, white.] Fifty species or more, mostly of the Old World tropics. Type species: *Phlomis zeylanica* L.

1. **Leucas martinicensis** (Jacq.) R. Br. Prodr. 504. 1810.

Clinopodium martinicense Jacq. Enum. 25. 1760.

Phlomis martinicensis Sw. Prodr. 88. 1788.

Annual; stem erect, branched, densely pubescent, 2–5 dm. high. Leaves ovate to lanceolate, membranous, crenate-dentate, 4–10 cm. long, pubescent on both sides, the apex blunt or acute, the base narrowed, the petioles about 2 cm. long or shorter; clusters densely many-flowered, distant, about 2.5 cm. in diameter in fruit; calyx oblique, recurved, pubescent, about 3 mm. long, its teeth setaceous, the upper much longer than the lower; corolla white, included, its lips nearly equal.

Waste and cultivated grounds, St. Croix; Tortola:—St. Martin to Trinidad; continental tropical America and Old World tropics.

4. **LEONURUS** L. Sp. Pl. 584. 1753.

Tall herbs, with palmately cleft, parted or dentate leaves, and small white or pink flowers verticillate in dense axillary clusters. Calyx tubular-campanulate, 5-nerved, nearly regular and equally 5-toothed, the teeth rigid, subulate or aristate. Corolla-limb 2-lipped; upper lip erect, entire; lower lip spreading or deflexed, 3-lobed, the middle lobe broad, obcordate or emarginate. Anthers 2-celled, the sacs parallel or divergent, style-branches equal. Nutlets 3-sided, smooth. [Greek, lion's-tail.] About 10 species, of Europe and Asia. Type species: *Leonurus Cardiaea* L.

1. **Leonurus sibiricus** L. Sp. Pl. 584. 1753.

Biennial, puberulent or glabrate; stem 6–18 dm. high. Leaves long-petioled, 3-parted into ovate or lanceolate, acute or acuminate, cleft and incised segments, the lobes lanceolate or linear, acute, the uppermost linear, or lanceolate; calyx campanulate, 6 mm. long, glabrous or minutely puberulent; corolla purple or red, densely puberulent without, 8–12 mm. long, its tube naked within; anther-sacs divergent.

River-banks, waste and cultivated grounds, Porto Rico, at lower and middle elevations; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Delaware and Pennsylvania; Bermuda; West Indies; continental tropical America and Old World tropics and subtropics. Appearing in America, as if introduced from the Old World. AGRIPALMA. MOTHERWORT. LION'S-TAIL.

5. **SALVIA** L. Sp. Pl. 23. 1753.

Herbs, or some species shrubs, with clustered flowers, the clusters mostly spiked, racemed or paniced. Calyx mostly naked in the throat, 2-lipped; upper lip entire or 3-toothed; lower lip 2-cleft or 2-toothed. Corolla strongly 2-lipped; upper lip entire, emarginate or 2-lobed; lower lip spreading, 3-cleft or 3-lobed. Anther-bearing stamens 2 (the posterior pair wanting or rudimentary); con-

nective of the anthers transverse, linear or filiform, bearing a perfect anther-sac on its upper end, its lower end dilated, capitate or sometimes bearing a small or rudimentary one. Nutlets smooth, usually developing mucilage and spiral tubes when wetted. [Latin, *salvus*, safe, from its healing virtues.] About 500 species, of wide distribution, known as MORADILLA, SAGE and SALVIA. Type species: *Salvia officinalis* L.

Corolla blue or white, 4–8 mm. long.

Diffusely spreading or prostrate.

Leaves acute, mostly narrowed at base.

Leaves obtuse, truncate at base.

Erect or ascending; leaves rounded or cordate at base.

Corolla red or scarlet, 2–2.5 cm. long.

Calyx 10–12 mm. long.

Calyx about 2 cm. long.

1. *S. occidentalis*.

2. *S. thomasiana*.

3. *S. serotina*.

4. *S. coccinea*.

5. *S. splendens*.

1. *Salvia occidentalis* Sw. Prodr. 14. 1788.

Salvia occidentalis bicolor Kuntze, Rev. Gen. Pl. 530. 1891.

Annual; stems diffuse, decumbent or prostrate, branched, densely pubescent, at least above, 0.5–2 m. long. Leaves ovate, 2–5 cm. long, serrate, short-petioled, acute or acuminate at the apex, narrowed or subtruncate at the base; panicles narrow, 0.5–3 dm. long, the verticels few-flowered, the lower ones distant, the upper close together; calyx about 3 mm. long, densely glandular-pubescent, ribbed, the upper lip obtuse, the lobes of the lower lip acute; corolla blue, about 5 mm. long, its tube a little shorter than the calyx; nutlets about 2 mm. long.

Banks, fields and thickets, Porto Rico, at lower and middle elevations in moist or wet districts; Vieques, St. Croix; St. Thomas; St. Jan; Tortola:—Florida; West Indies; continental tropical America; recorded from Bermuda. HAP-WEED.

2. *Salvia thomasiana* Urban, Symb. Ant. 7: 359. 1912.

Stem creeping, sometimes rooting at the lower nodes, very slender, about 3 dm. long, the flowering branches about 1 dm. high, short-pilose and with short glandular hairs. Leaves triangular, crenate, the apex obtuse or obtusish, the base truncate, sparingly pubescent above, minutely pilose beneath, the larger ones about 2 cm. broad, with petioles 2 cm. long, the smaller short-petioled; inflorescence terminal, spiciform, the flowers 1–4 in the verticels; flowering pedicels 1–1.5 mm. long, in fruit 2.5 mm. long; calyx 3 mm. long in flower, about 5 mm. long in fruit, glandular-pubescent, 9-nerved, the lobes about one-half as long as the tube, short-acuminate; corolla about 4.5 mm. long. [*S. tenella* of Schlechtendal and of Eggers, not of Swartz.]

Known only from a specimen collected long ago on St. Thomas by Ehrenberg. Endemic. This is, perhaps, the plant listed by Krebs as *S. tenella*.

3. *Salvia serotina* L. Mant. 1: 25. 1767.

Salvia micrantha Vahl, Enum. 1: 235. 1804.

Perennial, finely pubescent; stems 1.5–7 dm. high, much branched. Leaves ovate or orbicular-ovate, 1–4 cm. long, obtuse, crenate-serrate, rounded or subcordate at the base, slender-petioled; panicles 2–10 cm. long; calyx longer than the pedicels, glandular-hirsute, becoming 5–8 mm. long; lips about one-third as long as the long-campanulate tube; corolla 6–10 mm. long, white or blue, its tube included; style glabrous; nutlets fully 2 mm. long. [*S. dominica* of Swartz, not of Linnaeus; *S. tenella* of Grisebach and of Bello, not of Swartz.]

Local along roadsides, Porto Rico; Mona; St. Croix; St. Thomas; St. Jan; Tortola; Anegada:—Florida; Bermuda; West Indies south to Grenada; Yucatan.

4. *Salvia coccinea* Juss. in Murray, Comm. Goett. 1: 86. 1778.

Salvia pseudococcinea Jacq. Coll. 2: 302. 1788.

Salvia coccinea ciliata Griseb. Fl. Br. W. I. 490. 1861.

Salvia coccinea pseudococcinea A. Gray, Syn. Fl. 2: 368. 1878.

Annual, softly pubescent; stems erect, 3–7 dm. tall, simple or sparingly branched. Leaves ovate or deltoid-ovate, 3–6 cm. long, obtuse or acutish, crenate-serrate, truncate to subcordate at the base; panicles 5–20 cm. long; pedicels 2–6 mm. long, slender; calyx minutely pubescent, 10–12 mm. long, its tube many-ribbed, the upper lip reniform, abruptly pointed, the lower lobes ovate, apiculate; corolla deep scarlet, 2–2.5 cm. long, puberulent, the tube contracted above the base, then gradually enlarged, the lower lip 7–8 mm. broad, merely notched at the apex; nutlets 2.5 mm. long, slightly variegated.

Thickets, banks and roadsides, Porto Rico, at lower and middle elevations; St. Croix; St. Thomas; St. Jan:—southern United States; Bermuda; West Indies; continental tropical America. Appearing in Bermuda, the Bahamas and Porto Rico as if introduced. SCARLET SAGE.

5. *Salvia splendens* Sellow; Nees, Neuwied Reise Bras. 2: 335. 1821.

Puberulent or villous above, glabrous below, branched, somewhat woody, 6–10 dm. high. Leaves ovate, dentate, 4–10 cm. long, glabrous on both sides, acuminate at the apex, rounded, narrowed or obtuse at the base, the slender petioles about 3 cm. long or shorter; panicles terminal, several-many-flowered, the pedicelled flowers in whorls of 2–6; calyx narrowly campanulate, scarlet, sparingly pubescent, about 2 cm. long with 3 ovate, acute or acuminate teeth; corolla scarlet, 3–4 cm. long.

Escaped from cultivation to hillsides at middle elevations in Porto Rico; commonly planted for ornament in Porto Rico gardens. Native of Brazil. Widely cultivated for ornament.

Salvia fulgens Cav., Mexican, recorded by Krebs as grown in St. Thomas, is another ornamental species with ovate leaves, white-woolly beneath, much cultivated.

Salvia calaminthaefolia Vahl, a little-known plant, endemic in Hispaniola, was listed by Krebs from St. Thomas, doubtless in error.

6. **MENTHA** [Tourn.] L. Sp. Pl. 576. 1753.

Odorous herbs, with simple, mostly punctate leaves, and small whorled purple-pink or white flowers, the whorls axillary or in terminal spikes. Calyx 10-nerved, regular, or slightly 2-lipped, 5-toothed. Corolla-tube shorter than the calyx, the limb 4-cleft, the posterior lobe usually somewhat broader than the others, entire or emarginate. Stamens 4, equal, erect, included or exserted, sometimes imperfect; filaments glabrous; anthers 2-celled, the sacs parallel. Nutlets ovoid, smooth. [Name used by Theophrastus; from the nymph Minthe.] About 30 species, of the north temperate zone. Type species: *Mentha spicata* L.

Leaves short-petioled.
Leaves slender-petioled.

1. *M. nemorosa*.
2. *M. citrata*.

1. *Mentha nemorosa* Willd. Sp. Pl. 3: 75. 1801.

Mentha sylvestris nemorosa Benth. in DC. Prodr. 12: 167. 1848.

Perennial by leafy stolons; stem about 7 dm. high or shorter, pubescent or glabrous. Leaves mostly oblong or elliptic, 2–5 cm. long, serrate, short-petioled, mostly obtuse at the apex and rounded or obtuse at the base; flowers mostly in terminal spikes 7 cm. long or less; calyx-teeth subulate, acuminate; corolla pilose.

Forest borders and river-beds in the mountains of Porto Rico, determined by Urban from barren specimens. Hispaniola:—native of the Old World. The record by Eggers of *M. aquatica* L. along rivulets at Caledonia, St. Croix, based on barren specimens, may refer to this species; no species of the genus has been observed on St. Croix recently. YERBA BUENA.

2. *Mentha citrata* Ehrh. Beitr. 7: 150. 1792.

Mentha aquatica glabrata Benth. in DC. Prodr. 12: 171. 1848.

Perennial by leafy stolons; stem weak, decumbent or ascending, 3–6 dm. long. Leaves slender-petioled, thin, ovate or ovate-orbicular, obtuse or the upper acute at the apex, sharply serrate, the larger about 5 cm. long; whorls of flowers in terminal short obtuse spikes, and commonly also in the uppermost axils; calyx glabrous, its teeth subulate, one-half as long as the tube, or longer; corolla glabrous.

Sparingly escaped from cultivation in Porto Rico:—United States; Bahamas; Cuba; occasionally grown in Porto Rico and Virgin Island gardens. Native of the Old World. AGUA FLORIDA.

Mentha crispa L., *Mentha piperita* L., PEPPERMINT, and *Mentha viridis* L., SPEARMINT, were listed by Krebs as growing in St. Thomas prior to 1851. They are not known to exist within the limits of this Flora at the present time.

7. *HYPTIS* Jacq. Coll. 1: 101. 1786.

[MESOSPHAERUM P. Br. Hist. Jam. 257. Hyponym. 1756.]

Herbs, mostly erect and branched, the leaves usually dentate, the flowers variously clustered. Calyx tubular, ovoid or campanulate, equally 5-lobed, the lobes acute or aristate. Corolla 2-lipped, the upper lip erect or spreading, the lower saccate and drooping. Stamens 4, declined, all antheriferous, the filaments distinct, the anthers 2-celled. Ovary 4-carpellary; style basal. Nutlets smooth or rough. [Greek, bent backward.] About 300 species, mostly of tropical America, those of Porto Rico known as MARRUBIO. Type species: *Hyptis verticillata* Jacq.

Flowers sessile, in dense spikes or heads.

Spikes terminal, 2–7 cm. long.

Heads subglobose, axillary, peduncled.

Leaves slender-petioled.

Erect, 12 dm. high or less; heads 2–3 cm. in diameter, long-peduncled.

Procumbent or ascending; heads 10–12 mm. in diameter, short-peduncled.

Leaves sessile or very short-petioled; plant erect; heads 10–12 mm. in diameter.

Flowers pedicelled or subsessile, whorled or cymose-paniculate.

Fruiting calyx 6–10 mm. long.

Fruiting calyx only 2–3 mm. long.

Flowers in secund, paniced cymes.

Flowers in paniced whorls.

1. *H. americana*.

2. *H. capitata*.

3. *H. atrorubens*.

4. *H. lantanifolia*.

5. *H. suaveolens*.

6. *H. pectinata*.

7. *H. verticillata*.

1. *Hyptis americana* (Aubl.) Urban, Repert. 15: 322. 1918.

Nepeta americana Aubl. Pl. Guian. 2: 623. 1775.

Hyptis spicigera Lam. Encycl. 3: 185. 1789.

Hyptis gonocephala Griseb. Cat. Pl. Cub. 212. 1866.

Erect, rather stout, 2–7 dm. high, the stem and branches puberulent and short-prickly. Leaves lanceolate to ovate, slender-petioled, about 6 cm. long or shorter, glabrous or puberulent, serrate, the apex acute or acuminate, the base mostly narrowed; flowers white or blue, in dense terminal oblong spikes 2–7 cm. long; bracts linear; fruiting calyx-tube narrowly campanulate, pilose, strongly

ribbed and transversely veined, 4–5 mm. long, the subulate teeth about 2 mm. long. [*Mesosphaerum spicigerum* of Cook & Collins.]

Formerly found in a pasture near the road from Cabo Rojo to Mayagüez, Porto Rico:—Cuba; Hispaniola; continental tropical America and Old World tropics. Recorded from Jamaica.

2. *Hyptis capitata* Jacq. Icon. Rar. 1: 11. 1781–86.

Mesosphaerum capitatum Kuntze, Rev. Gen. Pl. 525. 1891.

Stem erect or ascending, 5–12 dm. high, somewhat pubescent above, rather stout, the branches slender. Leaves ovate to elliptic, membranous, 6–15 cm. long, coarsely and irregularly serrate, sparingly pubescent when young, glabrous when old, the slender petioles about 4 cm. long or shorter; bracts narrowly oblong, short, at length reflexed; flowers white, in dense globose slender-peduncled axillary heads 1–2 cm. in diameter; peduncles 1.5–6 cm. long; fruiting calyx-tube ribbed and transversely veined, glabrous, 4–5 mm. long, its setaceous teeth about one-third as long.

Fields, roadsides and thickets, Porto Rico, at lower and middle elevations in moist districts: Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Jamaica; Hispaniola; Cuba; Antigua to Trinidad; continental tropical America; Malaya. BLERO. WILD HOPS.

3. *Hyptis atrorubens* Poit. Ann. Mus. Paris 7: 466. 1806.

Mesosphaerum atrorubens Kuntze, Rev. Gen. Pl. 525. 1891.

Stems slender, creeping or ascending, often rooting at the lower nodes, loosely pubescent, at least above, 1.5–6 dm. long. Leaves ovate to oblong-lanceolate, thin, 1.5–5 cm. long, loosely pubescent, crenate, the apex obtuse or acute, the base mostly obtuse, more or less decurrent on the slender petiole; flowers white, in dense globose peduncled axillary heads about 1 cm. in diameter; peduncles 5–15 mm. long; bracts ovate, acute, appressed, about 6 mm. long; fruiting calyx tubular, glabrate, ribbed, truncate, 4–5 mm. long, its setaceous plumose teeth much shorter than the tube.

Fields, banks and thickets, Porto Rico, at lower and middle elevations in moist districts:—Jamaica; Hispaniola; Guadeloupe to Trinidad; continental tropical America; tropical Africa.

4. *Hyptis lantanifolia* Poit. Ann. Mus. Paris 7: 468. 1806.

Mesosphaerum lantanifolium Kuntze, Rev. Gen. Pl. 525. 1891.

Stems slender, erect or ascending, pubescent or puberulent, 4–15 dm. high, the branches commonly elongated. Leaves ovate to oblong, 2–5 cm. long, pubescent, crenate-dentate, subsessile or the lower short-petioled, the apex acute or obtuse, the base obtuse or narrowed; flowers white, in dense globose axillary peduncled heads 10–12 mm. in diameter; peduncles slender, 2–6 cm. long; bracts ovate or ovate-oblong, short; fruiting calyx-tube about 4 mm. long, ribbed and transversely veined, the linear-setaceous teeth 2–3 mm. long.

Fields, banks and hillsides, Porto Rico, in moist or wet districts, ascending to higher elevations, but not known to occur in the eastern mountains:—Cuba; Hispaniola; Trinidad; continental tropical America.

5. *Hyptis suaveolens* (L.) Poit. Ann. Mus. Paris 7: 472. 1806.

Ballota suaveolens L. Syst. ed. 10, 1100. 1759.

Hyptis ebracteata R. Br. in Ait. Hort. Kew, ed. 2, 3: 391. 1811.

Mesosphaerum suaveolens Kuntze, Rev. Gen. Pl. 525. 1891.

Stem stout, often much branched, loosely pilose, 3–8 dm. high. Leaves ovate or ovate-orbicular, slender-petioled, 4 cm. long or less, acute or obtuse at

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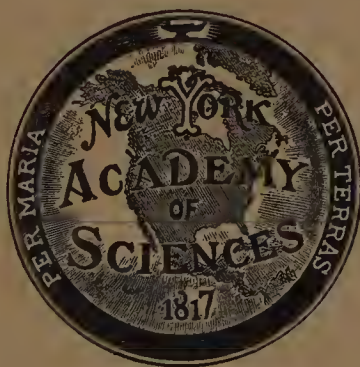
Porto Rico and the Virgin Islands

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Botany of Porto Rico and the Virgin Islands

Descriptive Flora—Spermatophyta (Continued)

N. L. Britton and Percy Wilson



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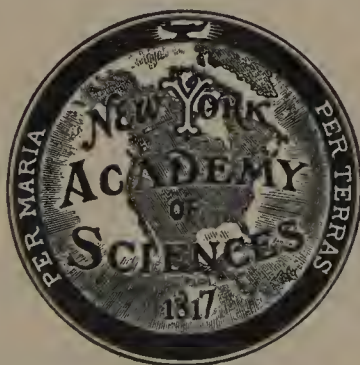
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the apex, obtuse or subcordate at the base, low-serrate, sparingly pubescent on both sides; flowers 2–5 together, nearly sessile, in short-peduncled, axillary clusters, or the clusters crowded in a terminal panicle and subtended by small leaves; calyx campanulate, strongly ribbed, at length 8–10 mm. long, its subulate teeth shorter than the tube; corolla 5–6 mm. long, bluish. [*Hyptis spicigera* of Bello, not of Lamarck.]

Fields, thickets, waste and cultivated grounds, Porto Rico, at lower and middle elevations; St. Croix; St. Thomas; St. Jan; Virgin Gorda:—Bahamas; Jamaica; Cuba; Hispaniola; Guadeloupe to Trinidad and Aruba; continental tropical America; tropical Asia. WILD SPIKENARD.

6. ***Hyptis pectinata*** (L.) Poit. Ann. Mus. Paris 7: 474. 1806.

Nepeta pectinata L. Syst. ed. 10, 1097. 1759.

Mesosphaerum pectinatum Kuntze, Rev. Gen. Pl. 625. 1891.

Ballota parviflora Sessé & Moçino, Fl. Mex. ed. 2, 136. 1894.

Stems erect, densely puberulent, 3–20 dm. high. Leaves ovate, 2–8 cm. long, serrate, acute at the apex, mostly obtuse or subcordate at the base, the petioles 4.5 cm. long or less; flowers in second spiked cymules, the inflorescence elongated; calyx 3–4 mm. long; puberulent, its subulate lobes nearly as long as the tube; corolla whitish, little longer than the calyx. [*Hyptis spicata* of Bello, not of Poiteau; *H. polystachya* of Stahl, not of Kunth.]

Hillsides, banks, thickets, waste and cultivated grounds, Porto Rico, Mona; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Florida; West Indies; continental tropical America and Old World tropics.

7. ***Hyptis verticillata*** Jacq. Icon. Rar. 1: 11. 1781–86.

Stem erect, strict, virgate, often tall, 1–5 m. high, puberulent above or glabrate, with many slender, ascending branches. Leaves lanceolate or oblong-lanceolate, thin, puberulent on the veins beneath, serrate, the larger lower ones 6–10 cm. long, the upper much smaller, the apex acuminate, the base narrowed, the slender petioles of the larger ones about 1 cm. long or shorter; flowers white, short-pedicelled, in separated small glomerules on the branches; bracts very small, narrow; fruiting calyx ovoid, faintly ribbed, 1.5–2 mm. long, its ovate teeth short, acute.

Recorded as long ago collected in eastern Porto Rico by Schwanecke, and recorded from St. Thomas by Benthams, by Krebs and by Grisebach:—Florida; Jamaica; Cuba; Hispaniola; Dominica; Martinique; Mexico to Colombia.

Hyptis scoparia Poit., attributed by Benthams to Porto Rico, was from Hispaniola.

Hyptis brevipes Poit., a species of Cuba, Trinidad and northern South America, was recorded by Krebs as found in St. Thomas, evidently in error.

8. **MARSYPIANTHES** Mart.; Benth. Lab. 64. 1833.

Pubescent, usually viscid, spreading or ascending herbs with small dentate leaves, the small bracted flowers mostly capitate. Calyx campanulate, enlarging in fruit, its 5 teeth equal. Corolla 2-lipped, the lower lip saccate. Stamens 4, didynamous, declined; anthers confluent 1-celled. Style 2-cleft at the apex. Nutlets ovoid, flattened, with a membranous fimbriate wing. [Greek, pouch-flower.] Three known species, of tropical and subtropical America, the following typical.

1. **Marsypianthes Chamaedrys** (Vahl) Kuntze, Rev. Gen. Pl. 524. 1891.

Clinopodium Chamaedrys Vahl, Symb. 3: 77. 1794.

Marsypianthes hyptioides Mart.; Benth. Lab. 64. 1832.

Stems slender, much branched, usually prostrate, 2–8 dm. long. Leaves ovate to oblong-lanceolate, thin, 1–4 cm. long, dentate, except at the base, the apex acute, the base narrowed or obtuse, the slender petioles 2–10 mm. long; heads axillary, short-peduncled, 1–2 cm. in diameter, several-many-flowered, villous; bracts linear-lanceolate; calyx-teeth ovate to lanceolate, at length spreading; corolla purple, rose or white, its tube about as long as the calyx.

Sandy moist fields and hillsides, Porto Rico, at lower and middle elevations in wet or moist districts:—Cuba; Guadeloupe; Montserrat; Dominica; Martinique; St. Vincent; Trinidad; continental tropical America. ORTELA.

9. **COLEUS** Lour. Fl. Coch. 2: 372. 1790.

Herbs or low shrubs, with broad, dentate crenate or incised leaves and rather small, blue or lilac flowers in verticillate clusters forming terminal spikes or racemes. Calyx campanulate, 5-toothed, declined in fruit. Corolla 2-lipped, the lower lip elongated, concave, entire. Stamens 4, didynamous, declined. filaments sometimes united below; anthers confluent 1-celled. Nutlets smooth. [Greek, a sheath, referring to the united filaments of some species.] Perhaps 90 species, natives of the Old World tropics. Type species: *Coleus amboinicus* Lour.

Leaves densely pubescent; flowers nearly sessile; plant shrubby.

Leaves puberulent or glabrous; flowers pedicelled; herbaceous.

1. *C. amboinicus*.

2. *C. Blumei*.

1. **Coleus amboinicus** Lour. Fl. Coch. 2: 372. 1790.

Plectranthus aromaticus Roxb. Hort. Beng. 45. 1814.

Coleus aromaticus Benth. in Wall. Pl. Asiat. Rar. 2: 16. 1831.

A pilose-tomentose fragrant, somewhat fleshy, straggling shrub, about 1 m. high or lower. Leaves broadly deltoid-ovate, crenate, 4–10 cm. long, tomentose-pilose on both sides, the apex acute or obtuse, the base subtruncate or subcordate, decurrent on the stout petiole; verticils of flowers forming elongated interrupted racemes 1–3 dm. long; pedicels very short; calyx tomentose, about 2 mm. long; tube of the corolla about twice as long, its lower lip about as long as the tube.

Occasionally escaped from cultivation, Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Jamaica; Cuba; Hispaniola; Anguilla to Trinidad; Venezuela. Widely grown for its fragrant foliage in gardens and escaped therefrom in the West Indies. Native of southeastern Asia. OREGANO DE ESPAÑA.

2. **Coleus Blumei** Benth. Lab. 56. 1832.

Herbaceous, puberulent or glabrate, erect, 6–10 dm. high, the branches slender. Leaves various, ovate to orbicular-ovate, 6–15 cm. long, crenate, dentate or incised, green, purplish, red, yellow or mottled, the apex acute or acuminate, the base narrowed, obtuse or rounded, the petioles 1–4 cm. long; verticils of flowers forming terminal, loose, more or less pubescent racemes; pedicels 1.5–2.5 mm. long; calyx 2–4 mm. long; corolla blue or nearly white, its tube longer than the calyx, the lower lip about 5 mm. long.

Occasionally escaped from cultivation, Porto Rico; St. Thomas; Tortola:—widely planted for ornament, in many races, and locally escaped in the West Indies and continental tropical America. Native of Java. VERGUENZA. COLEUS.

Coleus laciniatus (Blume) Benth., PIRIQUETA, with lacinate leaves, is occasionally grown in Porto Rican gardens. [*Plectranthus laciniatus* Blume.]

Coleus rotundifolius Chev. & Perrot, was grown from tubers at the Trujillo Plant Propagation Station in 1925. The tubers are edible, known as KAMILI; the species is probably native of tropical Africa.

10. **OCIMUM** L. Sp. Pl. 597. 1753.

Herbs or low shrubs, with erect or ascending branched stems, usually dentate, petioled leaves and verticillate flowers. Calyx deflexed in fruit, its tube campanulate or ovoid, 5-lobed, the lobes unequal, the lower somewhat united. Corolla white or nearly white, its tube usually shorter than the calyx, its lobes nearly equal. Stamens 4, didynamous, the lower pair appressed to the lower lip of the corolla; filaments naked or appendaged. Ovary 4-carpellary; style basal. Nutlets smooth or rugose. [Greek, odorous.] About 40 species widely distributed in warm and tropical regions. Type species: *Ocimum basilicum* L.

Flowers very short-pedicelled.

Flowers manifestly pedicelled.

Fruiting calyx 4-5 mm. long.

Fruiting calyx 7-8 mm. long.

1. *O. basilicum*.

2. *O. sanctum*.

3. *O. micranthum*.

1 **Ocimum basilicum** L. Sp. Pl. 597. 1753.

Annual, erect, branched, 3-6 dm. high, glabrous below, pubescent with recurved short hairs above. Leaves elliptic, ovate or oblong, 2-4 cm. long, slender-petioled, sparingly low-dentate or entire, glabrous, the apex acute, the base narrowed; inflorescence 20 cm. long or shorter, the verticils somewhat separated, pedicels very short; calyx long-ciliate, about 5 mm. long in fruit; the upper tooth broad, the 2 lateral teeth ovate, the 2 lower ones subulate; corolla 4-5 mm. long; upper filaments with a tooth-like appendage at the base.

Sparingly escaped from gardens to waste grounds in Porto Rico; commonly grown in Porto Rico and Virgin Island gardens as an aromatic herb:—Bahamas; Cuba; Martinique; Guadeloupe. Native of tropical Asia. ALBACA. BASIL.

2. **Ocimum sanctum** L. Mant. 1: 85. 1767.

Pereennial, erect or ascending, branched, pilose, often purplish, about 7 dm. high or lower. Leaves ovate to elliptic, dentate, slender-petioled, 3-5 cm. long; the apex obtuse or acute, the base narrowed or rounded; verticils few-several-flowered, approximate, the racemes solitary or several, about 10 cm. long or shorter; pedicels 2-3 mm. long; fruiting calyx 4-5 mm. long, sparingly ciliate, the upper tooth obovate, the 2 lateral ones subulate-tipped, the 2 lower subulate; corolla about 3 mm. long; upper filaments pilose at the base. [*O. americanum* of Bello, not of Linnaeus, *O. micranthum* of Stahl, not of Willdenow.]

Waste and cultivated grounds at lower elevations, Porto Rico:—Cuba; Curaçao; northern South America. Native of the Old World tropics. ALBAHACA.

3. **Ocimum micranthum** Willd. Enum. 630. 1809.

Annual, pubescent; stem erect, branched, 2-5 dm. high. Leaves ovate or oblong-ovate, 1-5 cm. long, serrate, acute at the apex, narrowed or subtruncate at the base, the petioles 5-20 mm. long; panicles 2-10 cm. long the verticils approximate; flowers several in the clusters; pedicels 4-7 mm. long; calyx puberulent, 7-8 mm. long in fruit, the upper lip concave, the lower of 4 narrow subulate-tipped lobes; corolla about 4 mm. long, its tube dilated above, its upper lip with 2 rounded lobes, the lower lip with 2 ovate lateral lobes and a notched middle one; filaments naked; nutlets about 1 mm. long.

Fields, hillsides, thickets and waste grounds, Porto Rico, at lower and middle elevations; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Florida; West Indies: continental tropical America. ALBACA CIMARRONA. WILD BASIL.

Rosmarinus officinalis L. ROSEMARY, European, occasionally grown in Virgin Island gardens, is a shrub about 1 m. high, with densely leafy, white-tomentose twigs, the linear entire leaves 2-3 cm. long, white-tomentose beneath,

their margins revolute, the blue or white flowers in axillary racemes, both calyx and corolla 2-lipped.

Thymus vulgaris L., THYME, European and Asiatic, recorded as formerly grown in the Virgin Islands, is shrubby, about 3 dm. high, with pubescent stems, entire obtuse dotted leaves only 4–10 mm. long and small glomerate purple flowers, the nerved calyx 2-lipped. It was recently grown at the Trujillo Plant Propagation Station.

Origanum Marjorana L., MEJORANA, SWEET MARJORAM, occasionally grown in Porto Rico and Virgin Island gardens, is a perennial herb with tomentose branches, the leaves gray-green, oval, obtuse, entire, about 1.5 cm. long, the small purplish flowers in dense oblong spikes, the calyx 2-lipped.

Melissa officinalis L., BEE-BALM, European, grown at the Trujillo Plant Propagation Station in 1925, is herbaceous, perennial, with slender-petioled ovate dentate leaves, and whitish axillary flowers about 10 mm. long, the corolla 2-lipped.

Stachys Sieboldii Miquel, CHINESE ARTICHOKE, Asiatic, recently grown at the Trujillo Station for its edible tubers, is herbaceous, about 5 dm. high, with ovate cordate leaves and small whitish spicate flowers.

Nepeta Cataria L., CATNEP, European, experimentally grown at the Trujillo Station in 1924, is an herbaceous perennial, with crenate cordate leaves, the small whitish flowers whorled in spikes.

Hyssopus officinalis L., HYSSOP, HISOPO, European, also grown at the Trujillo Station, is shrubby, 2–4 dm. high, with linear-oblong entire sessile leaves 2.5 cm. long, the blue flowers whorled in terminal spikes.

Family 8. **SOLANACEAE** Pers.

POTATO FAMILY.

Herbs, shrubs, vines, or some tropical species trees, with alternate or rarely opposite estipulate leaves, and perfect regular, or nearly regular, cymose or solitary flowers. Calyx inferior, mostly 5-lobed. Corolla gamopetalous, mostly 5-lobed, the lobes induplicate-valvate or plicate in the bud. Stamens as many as the lobes of the corolla and alternate with them, inserted on the tube, all perfect or only 2 or 4 perfect in some genera: anthers various, 2-celled, apically or longitudinally dehiscent. Ovary superior, 2-celled (rarely 3–5-celled); ovules numerous on the axile placentae, anatropous or amphitropous; style slender, simple; stigma terminal; fruit a berry or capsule. Seeds numerous; endosperm fleshy; cotyledons semiterete. About 75 genera and 1,750 species, most abundant in tropical regions.

A. Embryo of the seed much curved.

1. Ovary 2-celled.

a. Corolla salverform to narrowly campanulate.

Flowers solitary in the axils; small-leaved shrubs or vines.

Flowers fascicled; large-leaved shrubs or trees.

b. Corolla rotate or open-campanulate.

Berry mostly enclosed by the inflated calyx.

Berry subtended by the calyx.

Corolla not plicate.

Corolla plicate.

Anthers opening by terminal pores or slits.

Calyx 5-toothed or 5-cleft.

Calyx truncate, mostly with 10 linear teeth.

Anthers longitudinally dehiscent.

1. *Lycium*.

2. *Acnistus*.

3. *Physalis*.

4. *Capsicum*.

5. *Solanum*.

6. *Lycianthes*.

7. *Lycopersicon*.

- 2. Ovary 4-celled.
 Fruit fleshy, baccate; woody vines.
 Fruit dry, capsular or indehiscent; herbs or shrubs.
 Fruit narrowly oblong, indehiscent.
 Fruit globose or ovoid, dehiscent.
- B. Embryo straight or little curved.
 - 1. All the stamens perfect.
 Fruit baccate; shrubs and trees.
 Flowers 5-parted.
 Flowers 6-parted.
 Fruit capsular; mostly herbs.
 - 2. Only 2 or 4 stamens perfect.
 Annual herbs.
 Shrubs or trees.
- 8. *Swartzia*.
- 9. *Brugmansia*.
- 10. *Datura*.
- 11. *Cestrum*.
- 12. *Goetzea*.
- 13. *Nicotiana*.
- 14. *Browallia*.
- 15. *Brunfelsia*.

1. **LYCIUM** L. Sp. Pl. 191. 1753.

Shrubs, or woody vines, often spiny, with small alternate entire leaves, commonly with smaller ones fascicled in their axils, and white greenish or purple, solitary or clustered flowers. Calyx campanulate, 3–5-lobed or -toothed, not enlarged in fruit, persistent. Corolla-tube short or slender, the limb 5-lobed (rarely 4-lobed), the lobes obtuse. Stamens 5 (rarely 4); filaments filiform, sometimes dilated at the base; anther-sacs longitudinally dehiscent. Ovary 2-celled; style filiform; stigma capitate or 2-lobed. Berry globose, ovoid or oblong. [Named from the country Lycia.] About 75 species, widely distributed. Type species: *Lycium afrum* L.

1. **Lycium americanum** Jacq. Stirp. Am. 50. 1763.

A glabrous intricately branched shrub, 1.5 m. high or lower, the branches and twigs slender. Leaves spatulate, fascicled, 4–10 mm. long, somewhat fleshy, the apex rounded, the base narrowed to the short petiole; flowers axillary, solitary; peduncles about as long as the leaves or shorter, upwardly thickened in fruit; calyx about 3 mm. long, its lobes ovate; corolla white, about 8 mm. long, its lobes rounded; fruit globose or ellipsoid, 4–5 mm. long.

Rocky plain, Anegada:—Cuba; Hispaniola; Anguilla; St. Martin.

2. **ACNISTUS** Schott, Wien. Zeitsch. 4: 1180. 1829.

Shrubs or trees, with broad entire leaves, the flowers in sessile lateral fascicles, the pedicels mostly slender. Calyx campanulate, persistent, truncate, or with 5 short teeth. Corolla subcampanulate or nearly funnelform, the spreading limb usually 5-lobed. Stamens usually 5, borne on the corolla-tube, the filaments slender or filiform, the anthers erect. Ovary 2-celled; ovules many; style filiform; stigma 2-lamellate. Fruit a globose berry. Seeds compressed, rugulose, the embryo carved. [Greek, derivation uncertain.] About 12 species, natives of tropical America. Type species: *Cestrum cauliflorum* Jacq.

1. **Acnistus arborescens** (L.) Schlecht. Linnaea 7: 67. 1832.

Atropa arborescens L. Cent. Pl. 2: 10. 1756.

Cestrum cauliflorum Jacq. Hort. Schoen. 3: 41. 1798.

Acnistus cauliflorus Schott, Wien. Zeitsch. 4: 1180. 1829.

(?) *Acnistus frutescens* Bello, Anal. Soc. Exp. Hist. Nat. 10: 299. 1881.

Cestrum macrostemon Sessé & Moçino, Fl. Mex. ed. 2, 49. 1804.

A shrub, or a small tree 5–10 m. high, the foliage glabrous or floccose-pubescent. Leaves elliptic to oblong or ovate-elliptic, thin, 5–15 cm. long, the apex acute or obtuse, the base mostly narrowed, the petioles 1–3 cm. long;

fascicles several-flowered; pedicels 1.5–3 cm. long; calyx about 4 mm. long, its 5 teeth short; corolla greenish-white, about 12 mm. long, its short lobes ovate; berry yellow, 5–6 mm. in diameter.

Woods and thickets in wet or moist parts of the central districts of Porto Rico, ascending to higher elevations; St. Thomas:—Jamaica; Saba; Guadeloupe and Montserrat to Trinidad; continental tropical America. GALLINERO. GALAN ARBOREO.

3. *PHYSALIS* L. Sp. Pl. 182. 1753.

Herbs, sometimes a little woody below, with entire or sinuately toothed leaves. Peduncles slender, in our species solitary in the axils. Calyx campanulate, 5-toothed, in fruit enlarged and usually bladderly-inflated, membranous, 5-angled, or prominently 10-ribbed and reticulate, and wholly enclosing the pulpy berry. Corolla often with a brownish or purplish center, open-campanulate, or rarely campanulate-rotate, plicate. Stamens inserted near the base of the corolla; anthers oblong, opening by longitudinal slits. Style slender, somewhat bent; stigma minutely 2-cleft. Seeds numerous, kidney-shaped, flattened. [Greek, bladder, referring to the inflated calyx.] The number of recognized species is about 50, widely distributed. Type species: *Physalis Alkekengi* L. The plants are called SACA-BUCHE, GROUND-CHERRY and POPPS.

Fruiting calyx bladderly, closed at the top.

Leaves narrowed at the base.

Leaves rounded or cordate at the base.

Densely pubescent.

Glabrous or nearly so.

Fruiting calyx not bladderly, open at the top.

1. *P. angulata*.

2. *P. pubescens*.

3. *P. turbinata*.

4. *P. Eggersii*.

1. *Physalis angulata* L. Sp. Pl. 183. 1753.

Physalis Linkiana Dunal in DC. Prodr. 13¹: 448. 1852.

Physalis angulata ramosissima O. E. Schulz in Urban, Symb. Ant. 6: 143. 1909.

Erect or spreading, 4–9 dm. high, glabrous. Leaves ovate, usually with cuneate base and long-acuminate teeth, 5–6.5 cm. long, slender-petioled. thin, the veins not prominent; peduncles slender, 2–3 cm. long, erect, in fruit often reflexed but seldom exceeding the fruiting calyx; calyx-teeth triangular to lanceolate, generally shorter than the tube; corolla yellow, 5–10 mm. in diameter; anthers purplish; fruiting calyx about 3 cm. long, ovoid, not prominently angled, at last nearly filled by the yellow berry.

Fields, river-banks, waste and cultivated grounds at lower elevations, Porto Rico; Icacos; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda; Anegada:—southern United States; Bermuda; West Indies; tropical continental America and Old World tropics.

2. *Physalis pubescens* L. Sp. Pl. 183. 1753.

Physalis barbadensis Jacq. Misc. 2: 359. 1781.

Annual, pubescent and viscid. Stems tall and erect, or widely spreading, acutely 3–4-angled; leaves 3–6 cm. long, cordate, acute, or usually abruptly acuminate, sharply repand-dentate, pubescent with short hairs; peduncles short, at maturity sometimes 2 cm. long; calyx generally densely viscid-hirsute, its teeth lanceolate, acuminate; corolla 5–10 mm. in diameter, yellow, with a purplish eye; anthers purplish; fruiting calyx 2.5–3 cm. long, attenuate, reticulate, retuse at the base. [*P. angulata dubia* of Kuntze.]

Waste and cultivated grounds, Porto Rico, at lower elevations; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—southern United States; Bermuda(?); West Indies, south to Barbadoes; continental tropical America.

3. **Physalis turbinata** Medic. Act. Acad. Theod. Palat. 4: 189. 1780.

Annual, glabrous, or minutely puberulent when young. Stems rather stout, acutely angled and divaricately branched; leaves broadly ovate, obtuse or cordate and slightly oblique at the base, thin and dark green, repand-dentate, short-acuminate; peduncles short, in fruit about 1.5 cm. long, calyx-teeth lanceolate, acuminate, corolla 8–10 mm. wide, yellow with a purplish eye; fruiting calyx 3–3.5 cm. long, long-attenuate, almost pyramidal, deeply retuse at the base.

Waste and cultivated grounds, Porto Rico, at lower elevations; Vieques; St. Croix; St. Jan; Tortola; Virgin Gorda:—southern United States; Bermuda; West Indies; continental tropical America.

4. **Physalis Eggersii** O. E. Schulz in Urban, Symb. Ant. 6: 148. 1909.

Annual, short-pilose. Leaves oblong-elliptic, about 4 cm. long, entire or sparingly repand-dentate, the apex acutish, the base narrowed, the petiole about 1 cm. long; peduncles 4–7 mm. long in flower, about 11 mm. long in fruit; calyx in flower campanulate, in fruit open at the top, not angular nor bladdery, 10–12 mm. long; corolla 7.5 mm. long, funnel-form-campanulate, glabrous; stamens 5 mm. long, the anthers yellowish; berry 7 mm. in diameter.

Water Island, St. Thomas. Endemic. A species known only from the type specimen collected by Baron Eggers, and to us only from the description. We searched Water Island for it in 1913, but found no plant answering the description.

Physalis peruviana L., recorded by Eggers as found in fields at Rapoon, St. Thomas, prior to 1879, was, according to O. E. Schulz, erroneously determined, not of this genus. It has been cultivated in Porto Rico for its large yellow edible berries.

4. **CAPSICUM** L. Sp. Pl. 188. 1753.

Annual or perennial herbs or shrubs, with forking stems. Leaves flat, entire or repand. Flowers solitary in the axils, or in small cymes. Calyx scarcely accrescent, somewhat 5-lobed. Corolla usually white, nearly rotate, its lobes 5-imbricated. Stamens 5, adnate to the base of the corolla; anthers bluish, the sacs opening lengthwise. Ovary 2–3-celled; stigma club-shaped or dilated. Berries red, yellow or green, often nodding, pungent. Seeds flattened. [Latin, capsula, a box, referring to the shape of the fruit in forms of the typical species.] A few species, natives of America. Type species: *Capsicum annuum* L.

1. **Capsicum frutescens** L. Sp. Pl. 189. 1753.

Capsicum baccatum L. Mant. 1: 47. 1767.

Capsicum annuum baccatum Kuntze, Rev. Gen. Pl. 449. 1891.

Capsicum annuum frutescens Kuntze, loc. cit. 1891.

Shrubby, more or less pubescent. Stems 1–3 m. tall, sometimes vine-like, widely branching; leaves ovate, oblong-ovate or ovate-lanceolate, 2–5 cm. long, acute or acuminate, entire, abruptly narrowed or truncate at the base, petioles one-half as long as the blades or shorter; pedicels narrowly club-shaped; 1–2 cm. long; calyx 2.5–3 mm. long, its lobes as long as the tube or somewhat shorter; berries globose to ellipsoid, 5–10 mm. long, red, obtuse.

Thickets, woodlands, fields and hillsides, Porto Rico, at lower and middle elevations; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—southeastern United States; Bermuda; West Indies; continental tropical America and Old World tropics. AJI PICANTE. AJI CABALLERO. BIRD PEPPER. WILD PEPPER. RED PEPPER. Many races have been derived through cultivation from the wild pepper, their fruit very various in size, shape and flavor, some of them fruiting as herbaceous plants the first year.

5. **SOLANUM** L. Sp. Pl. 184. 1753.

Herbs or shrubs, often stellate-pubescent, sometimes climbing. Flowers cymose, umbelliform, paniculate, or racemose, often heterostylous. Calyx campanulate or rotate, mostly 5-toothed or 5-cleft. Corolla rotate, the limb plaited, 5-angled or 5-lobed, the tube very short. Stamens inserted on the throat of the corolla; filaments short; anthers linear or oblong, acute or acuminate, connate or connivent into a cone, each sac dehiscent by a terminal pore, or sometimes by a short introrse terminal slit, or sometimes also longitudinally. Ovary usually 2-celled; stigma small. Berry mostly globose, the calyx either persistent at its base or enclosing it. [Name, according to Wittstein, from *solamen*, quieting.] A very large genus, perhaps 900 species, of wide geographic distribution. Type species: *Solanum nigrum* L.

- A. Anthers short, not attenuate at the apex; unarmed species.
1. Leaves without long simple hairs.
 - Leaves glabrous, or with a few simple hairs.
 - Corolla white or bluish, 4 mm. long or less; herbaceous. 1. *S. nigrum*.
 - Corolla blue, 7 mm. long or longer.
 - Climbing vine; calyx subtruncate. 2. *S. Seaforthianum*.
 - Erect or ascending shrub; calyx 5-lobed. 3. *S. conocarpum*.
 - Pubescence of stellate or branched hairs.
 - Flowers 4.5 mm. long; pubescence of branched hairs. 4. *S. Riedlei*.
 - Flowers 7-12 mm. long; pubescence stellate.
 - Leaves scabrous-pubescent. 5. *S. rugosum*.
 - Leaves velvety-pubescent. 6. *S. verbascifolium*.
 2. Leaves stellate-pubescent and with many long simple hairs. 7. *S. mucronatum*.
- B. Anthers long, attenuate at the apex; plants mostly armed with prickles.
1. Flowers polygamous. 8. *S. polygamum*.
 2. Flowers perfect.
 - a. Inflorescence 1-5-flowered.
 - Pubescence villous; berry orange or scarlet.
 - Calyx not prickly; berry orange, 5-6 cm. in diameter. 9. *S. mammosum*.
 - Calyx prickly; berry 1-2 cm. in diameter. 10. *S. ciliatum*.
 - Pubescence of stalked, stellate hairs; berry green, 1-1.5 cm. in diameter. 11. *S. guanicense*.
 - b. Inflorescence several-many-flowered.
 - *Filaments connate throughout; narrow-leaved species.
 - Lateral leaf-veins 12-15 on each side of the midvein; leaves slender-petioled. 12. *S. racemosum*.
 - Lateral leaf-veins 20-30 on each side of the midvein; leaves short-petioled.
 - Leaves narrowed at base; corolla violet; berry red. 13. *S. persicifolium*.
 - Leaves rounded or oblique at base; corolla white; berry black. 14. *S. dryophilum*.
 - **Filaments distinct above; broad-leaved species.
 - Leaves sessile or very short-petioled; berry 4-6 mm. in diameter. 15. *S. jamaicense*.
 - Leaves manifestly petioled; berry 6-15 mm. in diameter.
 - Calyx and pedicels glanduliferous; erect tomentose shrub. 16. *S. torrum*.
 - Calyx and pedicels stellate-hirsute, not glandular; climbing glabrate shrub. 17. *S. lanceifolium*.

1. **Solanum nigrum** L. Sp. Pl. 186. 1753.

Solanum nodiflorum Dunal, Hist. Sol. 151. 1813. Not Jacq., 1788.

Solanum americanum Mill. Gard. Dict. ed. 8, no. 5. 1768.

Solanum nigrum virginicum Sw. Obs. 83. 1791.

Solanum caribaeum Dunal in DC. Prodr. 13¹: 48. 1852.

Solanum nigrum americanum O. E. Schulz in Urban, Symb. Ant. 6: 160. 1900.

Annual, glabrous, or somewhat pubescent with simple hairs, 3-8 dm. high. Leaves ovate, petioled, more or less inequilateral, 2-8 cm. long, thin, acute,

acuminate or acutish at the apex; peduncles lateral, umbellately 3–10-flowered; pedicels 6–14 mm. long; flowers 8–10 mm. broad; calyx-lobes oblong, obtuse, much shorter than the white or bluish corolla, persistent at the base of the berry; filaments somewhat pubescent; anthers obtuse; berries glabrous, globose, 8–10 mm. in diameter, black, on nodding pedicels.

Hillsides, river-banks, thickets, waste and cultivated grounds, Porto Rico; Mona; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—nearly throughout temperate and tropical regions, consisting of many slightly differing races. BLACK NIGHTSHADE. POP-BUSH. MATA GALLINA. YERBA MORA.

2. ***Solanum Seaforthianum*** Andr. Bot. Rep. 8: pl. 504. 1807.

An unarmed glabrous or sparingly pubescent vine, 1–6 m. long, the twigs angular, slender. Leaves thin, slender-petioled, various, pinnately divided, trifoliolate or simple, 5–10 cm. long, the segments ovate or elliptic, mostly acute or acuminate; inflorescence lateral or subterminal, several-many-flowered, paniculate; pedicels filiform, 4–6 mm. long; calyx only 1 mm. long, its margin sinuate or subtruncate; corolla violet-blue, lilac or rarely white, 7–10 mm. broad, its lobes ciliolate; anthers oblong, about 2 mm. long; berries globose, red, 6–10 mm. in diameter. [? *S. scandens* of Krebs.]

Banks, woods and thickets, Porto Rico, at lower and middle elevations, Vieques; St. Croix; St. Thomas; St. Jan; often planted for ornament in Porto Rico and the Virgin Islands:—Jamaica; Cuba to Trinidad and Margarita; continental tropical America. JASMIN DE ITALIA. FALSA BELLADONNA.

3. ***Solanum conocarpum*** Dunal; Poir. Encycl. Suppl. 3: 418. 1814.

An unarmed shrub with stout terete branches, glabrous, or sparingly pubescent with simple hairs when young. Leaves elliptic to obovate, 2.5–7.5 cm. long, entire, glabrous and shining when old, the apex rounded or emarginate, the base narrowed, the petioles only 2–4 mm. long; flowers few, usually geminate, lateral or subterminal; pedicels filiform, pilose, 4–6 mm. long; calyx about 3 mm. long, 5-lobed, the lobes ovate, pilose; corolla blue, about 2 cm. broad, its lobes triangular-ovate; anthers about 3 mm. long; berry ovoid-conic, about 3 cm. long, yellow, described as edible.

Coral Bay, St. Jan. Endemic. Recorded by Krebs from St. Thomas. MARRON-BACOA. This species is known to us from descriptions only.

4. ***Solanum Riedlei*** Dunal in DC. Prodr. 13¹: 109. 1852.

Shrubby, unarmed, the twigs densely stellate-tomentose. Leaves oblong or elliptic, 7–16 cm. long, entire or repand, glabrous and shining above, floccose and with branched hairs beneath, the apex short-acuminate, the base inequilateral, the petioles 8 mm. long; inflorescence terminal, corymbiform, many-flowered, peduncled; pedicels about 4 mm. long, tomentose; calyx about 3 mm. long, its lobes ovate, obtuse; corolla red, about 4.5 mm. long in bud, its ovate acute lobes tomentulose; anthers oblong, 2 mm. long. [*S. laurifolium* of Dunal, not of Linnaeus.]

A species doubtfully attributed to Porto Rico, collected only by Riedlé, and not known from elsewhere. The original specimen is preserved in the herbarium at Montpellier, illustrated by Dunal (Hist. Sol. pl. 8).

5. ***Solanum rugosum*** Dunal in DC. Prodr. 13¹: 108. 1852.

Solanum asperum Vahl, Eclog. 2: 17. 1798. Not L. C. Rich. 1792.

An unarmed shrub or tree up to 8 m. high, the twigs, leaves and inflorescence stellate-scabrous, the gray bark smooth. Leaves membranous, elliptic or elliptic-obovate, entire, large, 1.5–3 dm. long, the apex acuminate, the base decurrent, the petioles 4 cm. long or shorter; inflorescence corymbiform, terminal, stout-

peduncled, rather densely many-flowered; pedicels 2–4 mm. long; whitish-tomentose; calyx 4–5 mm. long, its lobes ovate, acutish; corolla white, nearly 2 cm. broad, stellate-tomentose, deeply lobed, its oblong-lanceolate lobes acute; anthers oblong, about 3 mm. long, berries yellow, globose, about 1 cm. in diameter.

Thickets, woods and hillsides, Porto Rico, in wet or moist districts, ascending to higher elevations:—Hispaniola; Guadeloupe; Dominica; Martinique; Guiana. TABACON ASPERO.

6. *Solanum verbascifolium* L. Sp. Pl. 184. 1753.

A stellate-tomentulose unarmed shrub, 1–3 m. high, rarely forming a small tree up to 10 m. high, with a trunk up to 1.5 dm. in diameter. Leaves ovate to elliptic, rarely obovate, 1–3 dm. long, entire or very slightly repand, acute, acuminate or obtuse at the apex, rounded or narrowed at the base, the stout petioles 7 cm. long or less; cymes terminal, several-many-flowered, long-peduncled; pedicels stout, 6–12 mm. long; calyx 5–7 mm. long, densely stellate, its lobes triangular-ovate; corolla white, 10–15 mm. wide, its lobes ovate-oblong; berry subglobose, 1–2 cm. in diameter, yellow. [*S. callicarpifolium* of Stahl, not of Kunth & Bouché.]

Thickets and hillsides at lower elevations, Porto Rico; Mona; Muertos; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Florida; West Indies; Mexico and Central America; Old World tropics. TABACON AFELPADO. BERENGENA DE PALOMA. WILD TOBACCO. TURKEY-BERRY. Referred by Urban to *S. erianthum* D. Don.

7. *Solanum mucronatum* O. E. Schulz in Urban, Symb. Ant. 6: 191. 1909.

An unarmed shrub about 2 m. high, the slender twigs umbellately clustered, stellate-pubescent with stiff hairs, or floccose-stellate. Leaves elliptic, 8–21 cm. long, entire, membranous, the apex acute and mucronate, the inequilateral base narrowed, the petioles 1–2 cm. long, the under surface prominently reticulate-veined and stellate-pubescent, the upper surface pubescent with long simple hairs and stellate hairs intermixed. Leaves at the bases of the twigs scale-like, linear, 3–4 cm. long.

Mountain woodlands, Calabazas near Coamo, Porto Rico; St. Thomas; St. Jan (according to Schulz). A plant known from foliage only; perhaps not of this genus.

8. *Solanum polygamum* Vahl, Symb. 3: 39. 1794.

Solanum polygamum thomae Kuntze, Rev. Gen. Pl. 455. 1891.

A stellate-tomentulose shrub 1–3 m. high, the twigs and leaf-midribs armed with straight slender prickles 4–10 mm. long, or some of them unarmed. Leaves oblong to ovate, chartaceous, 3–17 cm. long, entire or slightly repand, bright green above, yellowish beneath, the apex acute or obtuse, the base obtuse or subcordate, the petioles 0.5–4 cm. long, the venation impressed above; flowers white, polygamous; staminate inflorescence 1–20-flowered, umbelliform, the calyx about 2.5 mm. long with 4 or 5 obtuse lobes, the corolla 12–25 mm. broad with 4 or 5 acutish lobes, the 4 or 5 stamens with linear-oblong anthers about 3 mm. long; perfect flowers subterminal, solitary, larger than the staminate, the often prickly calyx 7–15 mm. long, the corolla 2–3 cm. broad, the stamens 5–7, the ovary densely tomentose; berry globose or depressed, stellate-hirsute, 10–20 mm. in diameter, orange or red. [*S. inclusum* and *S. inclusum albiflorum* of Eggers; *S. hirtum* of Borgesen & Paulsen.]

Dry woods between Punta Diablo and Salinas, Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—recorded from Hispaniola and from Guadeloupe. CAKALAKA-BERRY.

9. *Solanum mammosum* L. Sp. Pl. 187. 1753.

Subherbaceous, annual or perennial, 5–15 dm. high, armed with stout yellow prickles 1–2.5 cm. long, the branches and petioles stout, densely villous and viscid, with simple and glandular hairs. Leaves thin, large, suborbicular in

outline, lobed and coarsely dentate, 6–20 cm. long, loosely villous, the apex and lobes acute, the base cordate, the petioles 2–10 cm. long; inflorescence lateral, nearly sessile, 1–few-flowered; pedicels villous and glandular, slender, 5–10 mm. long; calyx about 5 mm. long, its linear acuminate villous lobes about 4 mm. long, its tube very short; corolla blue or violet, 3–4 cm. broad, deeply lobed, the lanceolate lobes recurved; filaments very short; anthers about 10 mm. long, linear-oblong, attenuate, yellow; berries ovoid, smooth, shining, orange, 4–6 cm. long, bluntly tipped.

Roadsides, waste grounds and thickets, Porto Rico, at lower and middle elevations in moist districts; St. Thomas; St. Croix:—Jamaica; Cuba; Hispaniola; Antigua to Trinidad; continental tropical America. BERENGENA DE MARIMBO. LOVE-APPLE.

10. ***Solanum ciliatum*** Lam. Tabl. Encycl. 2: 21. 1797.

Perennial, slightly woody, usually much branched, 6–12 dm. high, somewhat pilose, or becoming glabrous, the branches, petioles, leaf-blades and peduncles armed with straight yellow prickles. Leaves thin, broadly ovate in outline, 7–15 cm. long, pinnately lobed or repand; cymes few-flowered, lateral; calyx about one-third as long as the corolla, armed with stout prickles, its lobes ovate, acute; corolla white, about 12 mm. broad; anthers ovate-lanceolate, 5–6 mm. long; berry globose, scarlet, glabrous, 1–2 cm. in diameter. [*Solanum aculeatissimum* of authors, not of Jacquin.]

Recorded by Eggers as formerly naturalized at Frederiksted, St. Croix:—southern United States; Bermuda; West Indies; continental tropical America. COCKROACH BERRY.

11. ***Solanum guanicense*** Urban, Symb. Ant. 1: 399. 1899.

Herbaceous, annual, armed with slender yellow prickles 15 mm. long or shorter, the twigs, petioles and inflorescence pilose with long-stalked stellate hairs, the leaves stellate-pubescent. Leaves broadly ovate in outline, membranous, pinnately lobed and coarsely dentate, rather stout-petioled, the apex and lobes acute or obtuse, the base cordate; inflorescence lateral, peduncled, 1–2-flowered; pedicels 5–10 mm. long, thickened and recurved in fruit; calyx about 6 mm. long, densely prickly, its lanceolate-acuminate lobes accrescent; corolla blue or white, about 2 cm. broad, its lobes short; anthers linear, about 4 mm. long; berries globose, greenish, 1–1.5 cm. in diameter.

Shore of Lake Guanica, Porto Rico:—Cuba; Hispaniola; Costa Rica.

12. ***Solanum racemosum*** Jacq. Enum. 15. 1760.

Solanum ignaeum L. Sp. Pl. ed. 2, 270. 1762.

Shrubby, prickly or unarmed, 1–3 m. high, stellate-puberulent, the branches slender, the prickles 6 mm. long or shorter. Leaves oblong to oblong-lanceolate, thin, entire, 6–20 cm. long, the apex acute or acuminate, the base narrowed, the petioles about 2 cm. long or shorter, the lateral nerves rather distant; inflorescence lateral or subterminal, racemiform, peduncled, several-many-flowered; pedicels 6–15 mm. long, thickened upward, glabrate, reflexed in fruit; calyx about 2 mm. long, its ovate lobes obtuse; corolla white or violet, about 2 cm. broad, its lobes linear-oblong; anthers linear, about 8 mm. long; berries globose, smooth, red, shining, about 6 mm. in diameter. [*S. bahamense* of Eggers, not of Linnaeus.]

Hillside thickets, Desêcheo; St. Croix; St. Thomas; St. Jan:—St. Martin to Grenada and Barbados. CANKER-BERRY. This species and the following one are closely related to each other and to *S. bahamense* L.

13. ***Solanum persicifolium*** Dunal, Hist. Sol. 185. 1813.

Solanum ignaeum parvifolium Vahl, Eclog. 1: 23. 1796.

Solanum persicifolium angustifolium Dunal in DC. Prodr. 13¹: 185. 1852.

Solanum persicifolium Belloi O. E. Schulz in Urban, Symb. Ant. 6: 227. 1909.

Solanum persicifolium parvifolium O. E. Schulz, loc. cit. 1909.

Shrubby, 3 m. high or less, the stem and leaves prickly or sometimes unarmed, stellate-tomentulose, the prickles about 12 mm. long or shorter. Leaves oblong or linear-oblong, thin, entire, 5–12 cm. long, the apex acute or acuminate, the base narrowed, the petioles 4–7 mm. long; inflorescence lateral, several-many-flowered, racemiform; pedicels thickened upward, reflexed in fruit, about 10 mm. long; calyx about 1.5 mm. long, its lobes acute; corolla blue or violet, rarely white, 1.5–2 cm. broad; anthers 6–8 mm. long, linear; berries red; smooth, globose, about 5 mm. in diameter. [*S. bahamense* of Bello, not of Linnaeus.]

Coastal thickets and hillsides at lower elevations near the southern coast, and at Cabeza San Juan, Porto Rico; Culebra; Icacos; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda; Anegada. Recorded from Hispaniola. BERENGENA DE PLAYA.

14. ***Solanum drymophilum*** O. E. Schulz in Urban, Symb. Ant. 6: 227. 1909.

A prickly or nearly unarmed shrub, or a small tree 3–6 m. high, with slender branches, the twigs, inflorescence and petioles stellate-hirsute, the prickles straight, yellow, about 10 mm. long or shorter. Leaves oblong to lanceolate, loosely stellate-pubescent above, densely stellate beneath, 8–20 cm. long, thin, entire, the apex acuminate, the base very obliquely obtuse or subcordate, the petioles 1 cm. long or shorter; inflorescence lateral and subterminal, racemiform, several-many-flowered; pedicels very slender, about 12 mm. long, reflexed in fruit; calyx about 2.5 mm. long, its lobes ovate; corolla white, villous, about 2 cm. broad, its lobes narrow; anthers linear, about as long as the corolla-lobes; berries globose, black, shining, 5 mm. in diameter.

Forests and hillsides at middle and higher elevations in moist or wet districts of Porto Rico. Endemic.

15. ***Solanum jamaicense*** Mill. Gard. Dict. ed. 8. 1768.

Solanum brevipilum Dunal, Hist. Sol. 191. 1813.

Solanum cuneifolium Dunal, Hist. Sol. 193. 1813.

Solanum Willdenovianum G. Don, Gen. Syst. 4: 427. 1838.

Solanum portoricense Dunal in DC. Prodr. 13¹: 374. 1852.

Shrubby, stellate-tomentulose and more or less prickly, 1–3 m. high, the branches flexuous and rather stout, the prickles short, recurved, 6 mm. long or less. Leaves broadly ovate or suborbicular, thin, 7–25 cm. long, angulately lobed or nearly entire, the apex acute, the base narrowed and decurrent on the short petiole; inflorescence lateral, sessile or nearly so, several-flowered, umbelliform, much shorter than the leaves; pedicels 4–12 mm. long; calyx about 4 mm. long, its linear lobes recurved; corolla white, 10–15 mm. in diameter, its lobes lanceolate, acuminate; anthers oblong, about 5 mm. long; berries globose, red, shining, about 5 mm. in diameter.

Banks, thickets and roadsides, Porto Rico, at lower and middle elevations:—Jamaica; Cuba; Hispaniola; Martinique; Grenada; Trinidad; continental tropical America.

16. ***Solanum torvum*** Sw. Prodr. 47. 1788.

Solanum Maccai Rich.; Spreng. Syst. 1: 690. 1825.

Solanum daturaefolium Dunal in DC. Prodr. 13¹: 261. 1852.

Solanum torvum daturaefolium O. E. Schulz in Urban, Symb. Ant. 6: 236. 1909.

A stellate-tomentulose shrub, 1–4 m. high, the rather stout branches sparingly armed with short flattened, nearly straight prickles. Leaves lobed or sinuate-margined, 7–25 cm. long, acute or obtuse, truncate or subcordate at the base, sometimes with a few prickles on the petiole and on the midvein beneath, the upper surface scabrous; cymes lateral, short-peduncled, several-flowered; flowering pedicels slender, glandular, 5–8 mm. long, thickening in fruit; calyx glandular

about 4 mm. long, 5-cleft, its lobes ovate, acute; corolla white, 5-cleft, 10–15 mm. broad; berry globose, 10–14 mm. in diameter, yellow. [*S. inclusum* of Stahl, not of Grisebach.]

Hillsides, banks and thickets, Porto Rico, ascending to higher elevations; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Florida; West Indies; continental tropical America; Old World tropics. BERENGENA CIMARRONA. TURKEY BERRY.

17. ***Solanum lanceifolium*** Jacq. Coll. 2: 286. 1788.

Solanum ambiguum Dunal, Syn. 32. 1816.

Vine-like, sometimes 10 m. long and high-climbing, the twigs loosely stellate-pubescent and densely armed with recurved prickles 1–2 mm. long. Leaves ovate to lanceolate or elliptic, thin, entire or the base sinuate, 5–15 cm. long, the apex usually acute or acuminate, the base narrowed or rounded, the petioles 1–6 cm. long, often densely prickly, the midvein commonly prickly beneath; inflorescence lateral, several-flowered; peduncles as long as the petioles or shorter; pedicels 10–16 mm. long; calyx about 3 mm. long, stellate-hirsute, eglandular; corolla white or violet, about 2 cm. broad, its lobes oblong-lanceolate; anthers linear, about 6 mm. long; berry globose, red or orange, shining, 6–9 mm. in diameter.

St. Thomas (according to Krebs); Kings Hill, St. Jan:—Saba to Trinidad. Recorded from Hispaniola.

Solanum Melongena L., BERENGENA, EGG-PLANT, Asiatic, grown for its fruit in Porto Rico and the Virgin Islands, is herbaceous, tomentose and prickly, with large, flaccid, lobed leaves, the purplish flowers 5–6 cm. broad, the large edible berry oval or globose, in some races up to 3 dm. long. [*S. insanum* L.; *S. ovigerum* Dunal; *S. esculentum* Dunal.]

Solanum tuberosum L., PAPA, POTATO, Andean in origin, is grown for its edible tubers in Porto Rico and the Virgin Islands, but in limited quantities, the climate being too continually warm for its commercial development.

Solanum macrocarpum L., of Madagascar, cultivated on St. Croix (according to Schulz) is an herbaceous glabrous annual, with large lobed, nearly sessile leaves, blue or white flowers 4 or 5 cm. broad, the globose shining yellow berries 2 cm. in diameter.

Solanum pseudocapsicum L., SWEET PEPPER, JERUSALEM CHERRY, cultivated for its ornamental fruit in the Virgin Islands, is a glabrous shrub, about 1 m. high or less, with narrow entire leaves, few or solitary white flowers and globose yellow to scarlet berries 1–2 cm. in diameter. Its native habitat is unknown.

Solanum Wendlandii Hook. f., Costa Rican, occasionally planted for ornament in Porto Rico, is a long vine with somewhat prickly branches, the leaves, at least the lower ones, pinnately parted, the clustered, lilac-blue flowers about 5 cm. broad, very showy.

Solanum sisymbriifolium Lam. [*S. Richardii* Spreng; *S. Balbisii* Dunal], listed by Krebs as found in St. Thomas prior to 1851, is a species of continental tropical America, Cuba and the southeastern United States, not known to exist in St. Thomas at the present time, but may have been there formerly as a weed or a waif.

Solanum diphyllum L., of South America, **Solanum incanum** L., of the Old World tropics, **Solanum polyacanthum** Lam., of Cuba and Hispaniola and **Solanum micracanthos** Lam., of tropical America are all recorded by Krebs as formerly found in St. Thomas but nothing is known of any of them there at the present time.

6. **LYCIANTHES** [Dunal] Hassler, Ann. Cons. Jard.
Bot. Genève 20: 180. 1917.

Shrubs, rarely herbs, with simple, mostly entire leaves, and axillary flowers. Calyx campanulate, truncate, often 10-dentate, the teeth linear-subulate. Corolla rotate or broadly campanulate, plicate. Filaments short, equal or unequal; anthers mostly ellipsoid, dehiscent by small apical pores. Fruit a berry. [Greek, Lycium-flower.] Over 130 described species of tropical regions. Type species: *Solanum lycioides* L.

1. **Lycianthes virgata** (Lam.) Bitter, Abhand. Nat. Ver. Bremen 24: 370. 1919.

Solanum virgatum Lam. Tabl. Encycl. 2: 14. 1797.

Climbing or straggling, up to 5 m. long or longer, the young twigs slender, terete, stellate-tomentose. Leaves membranous, ovate to elliptic, 5–15 cm. long, more or less stellate-pubescent, the apex acute or acuminate, the oblique base rounded or narrowed, the petioles 2 cm. long or shorter; uppermost leaves opposite, one much smaller than the other; inflorescence several-flowered, sessile, the pedicels 10–20 mm. long; calyx about 3 mm. long, its 10 linear teeth about 1 mm. long; corolla blue-violet, about 2 cm. in diameter, plicate; one stamen longer than the other four; anthers oblong, about 4 mm. long; berry red, globose, about 8 mm. in diameter.

Woods and thickets in wet or moist parts of the central districts of Porto Rico, ascending to higher elevations:—Cuba; Hispaniola. BERENGENA DE PALOMA.

7. **LYCOPERSICON** Mill. Gard. Dict. Abr. Ed. 4. 1754.

Annual, or rarely perennial, coarse herbs, with 1–2-pinnately divided leaves, and lateral irregular raceme-like cymes of small yellowish flowers opposite the leaves. Calyx 5-parted, or rarely 6-parted, the segments linear or lanceolate. Corolla rotate, the tube very short, the limb 5-cleft or rarely 6-cleft, plicate. Stamens 5 (rarely 6), inserted on the throat of the corolla; filaments short; anthers elongated, connate or connivent, introrsely longitudinally dehiscent. Ovary 2–3-celled; style simple; stigma small, capitate. Berry in the wild plants globose or pyriform, much modified in cultivation, the calyx persistent at its base. [Greek, wolf-peach.] About 4 species, of South America, the following typical.

1. **Lycopersicon Lycopersicon** (L.) Karst. Deutsch. Fl. 966. 1882.

Solanum Lycopersicum L. Sp. Pl. 185. 1753.

Lycopersicon esculentum Mill. Gard. Dict. ed. 8. 1768.

Lycopersicum Humboldtii Dunal, Hist. Sol. 112. 1813.

Lycopersicum cerasiforme Dunal, Hist. Sol. 113. 1813.

Viscid-pubescent, much branched, 3–9 dm. high. Leaves petioled, 1.5–5 dm. long, the segments stalked, the larger 7–9, ovate or ovate-lanceolate, mostly acute dentate lobed or again divided, the several or numerous smaller ones inter-

spersed; flowers 10–16 mm. broad; calyx-segments about equalling the corolla; berry the well-known tomato or love-apple.

Spontaneous after cultivation and in waste grounds; Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—native of continental tropical America. Widely cultivated and more or less spontaneous in tropical and temperate regions. TOMATO. LOVE-APPLE.

8. **SWARTZIA** Gmel. Syst. 2: 360. 1791.

[*SOLANDRA* Sw. Vet. Akad. Handl. 8: 300. 1787. Not L. 1759.]

Climbing woody vines, with alternate petioled leaves and very large showy solitary terminal flowers. Calyx long-tubular, membranous, 2–5-cleft. Corolla funnelform, the tube cylindric below, expanded above, the limb with 5 broad imbricated spreading lobes. Stamens 5, borne at the base of the corolla, declined; filaments filiform; anthers oblong. Ovary 2-celled; style filiform; stigma 2-lamellate; ovules many. Fruit a large berry. [Commemorates Olaf Swartz, 1760–1817, distinguished Swedish botanist, professor in Stockholm.] A few species of tropical America, the following typical.

1. **Swartzia grandiflora** Gmel. Syst. 2: 360. 1791.

Solandra grandiflora Sw. Vet. Akad. Handl. 8: 300. 1787.

Solandra macrantha Dunal in DC. Prodr. 13: 533. 1852.

High-climbing on trees, up to 12 m. long or longer, glabrous, the twigs stout. Leaves elliptic or obovate, membranous, 6–12 cm. long, distantly pinnately veined, the apex abruptly acute, the base rounded or narrowed, the slender petioles 2–4 cm. long; peduncle short; calyx 5–9 cm. long, its lobes acute; corolla cream-colored or yellow, or white, turning yellow, 16–20 cm. long, the cylindric part of the tube about as long as the calyx or longer, the limb up to 12 cm. broad; stamens about 15 cm. long, included; berry ovoid, pointed, 4–5 cm. long.

Woodlands and forests at higher elevations, central and western districts of Porto Rico, and planted for ornament in Porto Rico and at Louisenhöj, St. Thomas:—Jamaica; Guadeloupe; Martinique; St. Vincent. BEJUCO DE PEDRO.

Swartzia longiflora (Tuss.) Britton & Wilson, of Cuba and Hispaniola, grown at the St. Croix Agricultural Experiment Station in 1925, appearing vigorous, has obovate cuneate leaves, the white corolla up to nearly 3 dm. long, the cylindric part of its tube much longer than the calyx. [*Solandra longiflora* Tuss.]

9. **BRUGMANSIA** Pers. Syn. 1: 216. 1805.

Shrubs or trees, with large alternate membranous petioled leaves, and very large, drooping, white yellowish or red flowers, solitary on curved peduncles. Calyx angled, spathaceous or 5-cleft. Corolla long-funnelform, cylindric below, campanulate above, the limb with 5 acuminate lobes. Stamens 5, included; filaments filiform. Ovary 2-celled; style filiform. Capsule spindle-form, unarmed. [Commemorates S. J. Brugmans, professor in Leyden.] A few species, of Mexico and South America. Type species: *Brugmansia candida* Pers.

1. **Brugmansia suaveolens** (H. & B.) Bercht. & Presl, Rostl. Solan. 45. 1823.

Datura suaveolens H. & B.; Willd. Hort. Berol. 227. 1809.

A shrub, 2–3.5 m. high, the twigs and leaves finely puberulent or glabrate. Leaves ovate to elliptic, distantly pinnately veined, large, about 3 dm. long or

shorter, the apex acute or acuminate, the base narrowed or oblique, the petioles of the larger ones up to 12 cm. long, those of the upper leaves much shorter; peduncle 2–6 cm. long; calyx swollen, 9–13 cm. long, 5-cleft, its lobes acute; corolla white, 2.5–3 dm. long, the cylindrical part of the tube about as long as the calyx or longer, the campanulate part about as long as the tube, the limb spreading, with 5 subulate teeth; anthers about 3 cm. long; capsule fusiform, puberulent, tipped, 6–12 cm. long; seeds compressed, irregularly roughened.

Along streams at lower and middle elevations in wet or moist districts of Porto Rico, and grown for ornament in gardens:—Jamaica; Cuba; Hispaniola; Guadeloupe to St. Vincent; continental tropical America. CAMPANA DE PARIS. MOON-PLANT.

Brugmansia arborea (L.) Steud., CORNUCOPIA, South American, occasionally planted for ornament in Porto Rico and recorded by Krebs as formerly grown in St. Thomas, differs in being densely pubescent and the calyx 2-cleft to about the middle. [*Datura arborea* L.; *Brugmansia candida* Pers.]

10. **DATURA** L. Sp. Pl. 179. 1753.

Tall narcotic herbs, some tropical species shrubs or trees, with alternate petioled leaves, and large solitary erect, short-peduncled, white purple or violet flowers. Calyx elongated-tubular or prismatic, its apex 5-cleft or spathe-like, in the following species circumscissile near the base, which is persistent and subtends the prickly capsule. Corolla funnelform, the limb plaited, 5-lobed, the lobes broad, acuminate. Stamens included or little exserted; filaments filiform, very long, inserted at or below the middle of the corolla-tube. Ovary 2-celled, or falsely 4-celled; style filiform; stigma slightly 2-lobed. Capsule 4-valved from the top, or bursting irregularly. [The Hindoo name, dhatura.] About 12 species of wide distribution, known in Porto Rico as ESTRAMONIO and CHAMISCO. Type species: *Datura Stramonium* L.

Spines of the capsule subulate.

Capsule erect.

Capsule nodding.

Spines of the capsule short, deltoid.

1. *D. Stramonium*.

2. *D. Metel*.

3. *D. fastuosa*.

1. **Datura Stramonium** L. Sp. Pl. 179. 1753.

Datura Tatula L. Sp. Pl. ed. 2, 256. 1762.

Annual, glabrous or the young parts sparingly pubescent; stem stout, 3–15 dm. high. Leaves thin, ovate, acute or acuminate, mostly narrowed at the base, 0.7–2 dm. long, irregularly sinuate-lobed, the lobes acute; flowers white or violet, about 1 dm. high; calyx prismatic, less than one-half the length of the corolla; capsule ovoid, erect, prickly, about 5 cm. high.

Waste and cultivated grounds, Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Bermuda; West Indies; temperate and tropical regions of the Old World and the New. Consists of numerous slightly differing races. THORN-APPLE.

2. **Datura Metel** L. Sp. Pl. 179. 1753.

Annual, finely glandular-pubescent, 1–3 m. high. Leaves broadly ovate, acute, inequilateral, rounded or subcordate at the base, 1–2.5 dm. long; flowers white, 1.5–1.8 dm. high; calyx about one-half as long as the corolla; capsule globose or ovoid-globose, nodding, obtuse, long-prickly and pubescent, 2.5–4 cm. in diameter.

Waste and cultivated grounds, Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—southeastern United States; West Indies, south to Martinique; Margarita; Curaçao; Aruba; continental tropical America and Old World tropics. PRICKLY-BUR.

3. *Datura fastuosa* L. Syst. ed. 10, 932. 1759.

Annual, nearly glabrous; stem erect, branched, 1–2 m. high. Leaves ovate-lanceolate to elliptic, 5–17 cm. long, acute or acuminate, undulate or repandentate, the slender petioles 3–7 cm. long; calyx about 6 cm. long, its ovate lobes acute or short-acuminate; corolla violet without, white within, 14–18 cm. long; capsule ovoid, 4–6 cm. long, its short-stout prickles corrugated at the base.

Thickets and waste grounds, spontaneous after cultivation for ornament, Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan:—Florida; Cuba; Hispaniola; St. Kitts to Trinidad; Colombia. Native of the Old World tropics. CHAMISCO MORADO. GARDEN DATURA.

11. *CESTRUM* L. Sp. Pl. 191. 1753.

Shrubs or trees, with alternate entire petioled leaves, the mostly yellow or white flowers in cymes or panicles. Calyx 5-lobed or 5-toothed. Corolla salverform or funnelform, the tube long, slender, the 5 lobes spreading. Stamens borne on the corolla-tube, included; filaments filiform, often pilose below, sometimes with a tooth-like appendage; anthers small, their sacs parallel. Ovary 2-celled, usually short-stipitate; ovules few; style filiform; stigma dilated, entire or 2-lobed. Fruit a small berry. Seeds oblong, smooth. [Greek, hammer, referring to the filaments.] Perhaps 150 species, natives of tropical America. Type species: *Cestrum nocturnum* L.

Filaments bent, denticulate below.

Corolla 2–2.5 cm. long; panicles large, longer than the leaves; berry white.

Corolla less than 2 cm. long; panicles small, much shorter than the leaves; berry black.

Petioles slender; corolla-lobes oblong; leaves elliptic to oblong or obovate, shining.

Petioles stout; corolla-lobes broadly ovate or suborbicular; leaves broadly elliptic, dull.

Filaments straight, not denticulate.

Stigma exserted; corolla white.

Stigma included; corolla greenish.

1. *C. nocturnum*.

2. *C. laurifolium*.

3. *C. macrophyllum*.

4. *C. diurnum*.

5. *C. alternifolium*.

1. *Cestrum nocturnum* L. Sp. Pl. 191. 1753.

A shrub 2–4 m. high, the slender branches elongated, sometimes vine-like, glabrous. Leaves elliptic or ovate-elliptic, 5–15 cm. long, glabrous when mature, the apex acuminate, the base narrowed or rounded, the petioles 8–20 mm. long; panicles large, several-many-flowered, longer than the leaves; pedicels short or the lower ones 5–9 mm. long; flowers yellow or greenish yellow, fragrant; calyx tubular-campanulate, about 3 mm. long, its teeth short; corolla narrowly funnelform, about 2.5 cm. long, the limb about one-fourth as long as the tube; filaments toothed near the base; berry ellipsoid, white, about 1 cm. long.

Occasionally escaped from cultivation in Porto Rico; recorded by Eggers as in forests on St. Jan; often planted in Porto Rico and Virgin Island gardens, the flowers opening in the evening:—Jamaica; Cuba; Hispaniola; Martinique. DAMA DE NOCHE. LADY-OF-THE-NIGHT.

2. *Cestrum laurifolium* L'Her. Stirp. Nov. 4: 69. 1788.

Cestrum laurifolium neglectum and *intermedium* Kuntze, Rev. Gen. Pl. 451. 1891.

Cestrum citrifolium Ritz. in Hoffm. Phyt. Bl. 1: 36. 1803.

A glabrous shrub, 1.5–4 m. high. Leaves elliptic to oblong or obovate, subcoriaceous, shining above, 5–17 cm. long, the apex obtuse, acute or short-acuminate, the base narrowed or obtuse, the slender petioles 4–15 mm. long; panicles small, few-flowered, much shorter than the leaves; calyx about 3 mm. long, narrowly campanulate in flower, broader in fruit, its teeth short and broad,

ciliolate; corolla yellow or greenish yellow, narrowly funnellform, 10–17 mm. long, the limb about one-fourth as long as the tube, the lobes oblong-ovate, obtuse; filaments denticulate; berry subglobose or ellipsoid, 7–10 mm. long, purple-black when mature. [*C. diurnum* of Sessé & Mocino, of West, and of Eggers, not of Linnaeus.]

Thickets, woods and hillsides, Porto Rico, at lower and middle elevations, mostly in wet or moist districts; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Cuba; Hispaniola; Saba to Trinidad. GALAN DEL MONTE.

3. **Cestrum macrophyllum** Vent. *Choix des Plantes* 18. 1803.

Cestrum laurifolium macrophyllum Kuntze, *Rev. Gen. Pl.* 451. 1891.

A shrub 3 m. high or less, or a small tree 4–5 m. high, glabrous throughout. Leaves broadly elliptic to obovate-elliptic, chartaceous, 8–18 cm. long, the apex obtuse, rounded or acute, the base narrowed or rounded, the stout petioles 10–25 mm. long; panicles small, few-flowered, much shorter than the leaves; calyx campanulate, 2–2.5 mm. long; corolla 10–12 mm. long, its broadly ovate to sub-orbicular lobes obtuse; filaments denticulate; berry subglobose or ellipsoid, black, 6–8 mm. long. [? *C. latifolium* of Bello, not of Lamareck; *C. laurifolium* of Stahl, not of L'Heritier.]

Woods, banks and hillsides, in wet or moist districts of Porto Rico, ascending to higher elevations:—Hispaniola. GALAN DEL MONTE.

4. **Cestrum diurnum** L. *Sp. Pl.* 191. 1753.

? *C. diurnum portoricense* O. E. Schulz in *Urban, Symb. Ant.* 5: 490. 1908.

A shrub 1–2 m. high, the slender twigs and inflorescence glabrous or more or less pubescent. Leaves oblong or oblong-elliptic, membranous, light green, 6–11 cm. long, acute at the apex, narrowed or obtuse at the base, the petioles slender, 3–12 mm. long; panicles several-flowered, about as long as the leaves or shorter, often with some leaf-like bracts; flowers fragrant; calyx campanulate, 3–3.5 mm. long; corolla white, 12–18 mm. long, its lobes oblong, obtuse; stamens straight, edentate; berry black, ellipsoid, 6–7 mm. long.

Banks and roadsides at lower elevations; Porto Rico, appearing as if introduced:—Jamaica; Cayman Islands; Cuba; Hispaniola; Mexico. Introduced into southern Florida. Grown in Porto Rico and Virgin Island gardens.

5. **Cestrum alternifolium** (Jacq.) O. E. Schulz in *Urban, Symb. Ant.* 6: 270. 1909.

Ixora alternifolia Jacq. *Enum.* 12. 1760.

Cestrum vespertinum L. *Mant.* 2: 206. 1771.

A shrub, 1–3 m. high, the slender twigs pubescent. Leaves ovate, ovate-oblong or elliptic, membranous, 5–13 cm. long, pubescent on the veins beneath, or glabrate, the apex acute or acuminate, the base rounded or narrowed, the petioles 5–8 mm. long; panicles few-several-flowered, umbelliform; calyx campanulate, about 3 mm. long, its teeth short and broad; corolla greenish purple, 2–2.5 cm. long, its lobes narrowly oblong; stamens edentate; berry ellipsoid, 9–15 mm. long, black.

Recorded as found by Eggers in the Luquillo Mountains, Porto Rico; St. Thomas:—Guadeloupe to Trinidad; northern South America.

A species of **Cestrum** forming a shrub about 2 m. high, with slender puberulent twigs, glabrous short-petioled lanceolate leaves 4–6 cm. long, the flowers in short peduncled panicles, the white corolla 2–2.5 cm. long, its tube glabrous, its short lobes densely tomentulose, was seen in a garden at St. Thomas in March, 1925.

12. **GOETZEA** Wydler, *Linnaea* 5: 423. 1830.

A tree with alternate petioled coriaceous pinnately many-veined leaves, and rather large orange flowers in small cymes. Calyx campanulate, 6-cleft. Corolla funnelform, the limb 6-lobed, the lobes reflexed. Stamens 6, exserted, borne near the base of the corolla-tube; filaments filiform; anthers oblong. Ovary sessile, 2-celled, villous; style filiform; stigma 2-lobed; ovules few, pendulous. Fruit an obovoid coriaceous berry. [Named in honor of J. A. P. Goetze, German theologian.] A monotypic genus of Porto Rico.

1. **Goetzea elegans** Wydler, *Linnaea* 5: 423. 1830.

Ilex exandra Bello, *Anal. Soc. Esp. Hist. Nat.* 10: 251. 1881.

A tree, 8–10 m. high, the bark smooth, the twigs slender. Leaves ovate to elliptic, 2–7 cm. long, shining, the lateral venation nearly parallel, the secondary venation strongly reticulated, the veins puberulent on the under side, the apex acute, the petioles about 8 mm. long or shorter; cymes terminal (or also axillary?); pedicels 6–12 mm. long; calyx about 6 mm. long, its narrow lobes acute; corolla about 2.5 cm. long, its lobes ovate, acute; stamens exserted; berry orange.

Woodlands, Sierra de Luquillo and near Aguadilla and Quebradillas. Not recently observed by botanists. Endemic. MATA BUEY.

13. **NICOTIANA** [Tourn.] L. Sp. Pl. 180. 1753.

Viscid-pubescent narcotic herbs or shrubs, with large alternate entire or slightly undulate leaves, and white yellow greenish or purplish flowers, in terminal racemes or panicles. Calyx tubular-campanulate or ovoid, 5-cleft. Corolla-tube usually longer than the limb, 5-lobed, the lobes spreading. Stamens 5, inserted on the tube of the corolla; filaments filiform; anther-sacs longitudinally dehiscent. Ovary 2-celled (rarely 4-celled); style slender; stigma capitate. Capsule 2-valved, or sometimes 4-valved at the summit. Seeds numerous, small. [Named for John Nicot, French ambassador to Portugal, who sent some species to Catherine de Medici, about 1560.] About 50 species, mostly natives of America, the following typical.

1. **Nicotiana Tabacum** L. Sp. Pl. 180. 1753.

Annual, 1–2 m. high, little branched or simple-stemmed. Leaves oblong to oblong-lanceolate, 1–3 dm. long, sessile, acute or acuminate at the apex, narrowed at the base, the lower ones decurrent on the stem; calyx about 12 mm. long, its lobes ovate; corolla funnelform, about 5 cm. long, pink, its lobes triangular-subulate; capsule longer than the calyx.

Occasionally spontaneous after cultivation; Porto Rico, St. Croix; St. Thomas; St. Jan:—native of South America. Widely cultivated and spontaneous in temperate and tropical regions; one of the most important crops of Porto Rico. **TABACO.** **TOBACCO.**

14. **BROWALLIA** L. Sp. Pl. 631. 1753.

Annual, glabrous or viscid-pubescent herbs, with thin entire leaves, the blue, violet or white flowers solitary, lateral, or in terminal one-sided racemes. Calyx narrowly campanulate, 4–5-toothed. Corolla salverform, the somewhat irregular limb spreading, 5-lobed. Perfect stamens 4, didynamous, included, the fifth rudimentary or wanting. Ovary 2-celled, short-stipitate; style filiform;

stigma 2-lamellate. Capsule enclosed by the calyx, its valves 2-cleft. Seeds reticulated; embryo straight or slightly curved. [Commemorates Johann Browallius, 1707–1737, Swedish botanist.] A few closely related species natives of tropical America, the following typical.

1. **Browallia americana** L. Sp. Pl. 631. 1753.

Browallia demissa L. Syst. ed. 10, 1118. 1759.

Glabrous, or glandular-pubescent above, slender, branched, about 6 dm. high or lower. Leaves ovate, 2–6 cm. long or the upper much smaller, slender-petioled, the apex acute or acuminate, the base obtuse or rounded; pedicels slender, 5–15 mm. long; flowering calyx 3–4 mm. long, its teeth acute; corolla blue or violet, its slender tube 10–13 mm. long, its limb about 12 mm. broad; capsule 6–8 mm. long.

River-banks near Mayaguez and Maricao, probably introduced:—Jamaica; Guadeloupe to Trinidad; continental tropical America; recorded from Hispaniola. Grown for ornament in Porto Rican gardens. MARGARITA. PENSAMIENTOS DE POBRE.

15. **BRUNFELSIA** [Plum.] L. Sp. Pl. 191. 1753.

Shrubs or trees with entire, coriaceous or chartaceous leaves, the large showy flowers terminal, clustered, or often solitary. Calyx campanulate or tubular, 5-lobed or 5-cleft. Corolla salverform, the limb 5-lobed, spreading, the lobes obtuse or rounded. Stamens 4, didynamous, included, all anther-bearing or 2 sterile. Ovary 2-celled; ovules many; style incurved at apex; stigma 2-lamellate. Fruit globose or ovoid, fleshy or coriaceous, indehiscent or tardily partly dehiscent. Seeds rugose, the embryo a little curved. [Commemorates Otto Brunfels, German physician and botanist, died 1534.] About 30 species, natives of tropical America. Type species: *Brunfelsia americana* L.

Corolla-tube 5–8 cm. long; leaves obovate to lanceolate.

Calyx campanulate, 6–12 mm. long.

Calyx 6–7 mm. long; corolla-tube slender, about 5 cm. long; fruit about 1.5 cm. in diameter.

Calyx 12 mm. long; corolla-tube stout, 6–7 cm. long; fruit about 2.5 cm. in diameter.

Calyx tubular, 3–4 cm. long.

Corolla-tube 10–14 cm. long; leaves linear to linear-oblongate.

1. *B. americana*.
2. *B. lactea*.
3. *B. portoricensis*.
4. *B. densifolia*.

1. **Brunfelsia americana** L. Sp. Pl. 191. 1753.

Brunfelsia americana pubescens Griseb. Fl. Br. W. I. 432. 1861.

A shrub 1–3 m. high or a small tree about 5 m. high, the twigs glabrous or pubescent. Leaves elliptic, oblong or obovate, chartaceous, glabrous on both sides or pubescent beneath, loosely reticulate-veined, 5–10 cm. long, the apex acute, obtuse, rounded or emarginate, the base narrowed or obtuse, the petioles 3–8 mm. long; flowers terminal, fragrant, usually solitary, short-peduncled; calyx campanulate, about 6 mm. long; corolla white with a purplish center, soon fading yellow, its tube 4.5–5.5 cm. long, its limb 3–4.5 cm. broad, the lobes rounded; fruit globose, yellow, 1–2 cm. in diameter.

Woodlands at middle and higher elevations in the eastern mountains of Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan; Tortola;—St. Eustatius to Dominica. Frequently grown in gardens for ornament. AGUACERO. ALELI. RAIN-TREE.

2. **Brunfelsia lactea** Krug & Urban, Not. Berl. Bot. Gart. 1: 323. 1897.

A glabrous shrub, 1–3 m. high, or a tree up to about 12 m. high. Leaves scattered, or clustered at the ends of short twigs, various, elliptic to oval or

obovate, coriaceous, 5–15 cm. long, reticulate-veined, the apex acute, acuminate or obtusish, the base obtuse or narrowed, the petioles 4–15 mm. long; flowers solitary, terminal, white, sometimes appearing lateral on short twigs; peduncles about 1 cm. long, calyx campanulate, 10–12 mm. long, its short ovate lobes rounded; corolla-tube rather stout, about 7 cm. long; corolla-limb about as broad as the length of the tube, its broad lobes rounded; fruit globose, 2–2.5 cm. in diameter.

Forests at high elevations in the eastern mountains of Porto Rico, ascending to the summits, and on Monte Torito near Cayey. Endemic. VEGA BLANCA.

3. **Brunfelsia portoricensis** Krug & Urban, Not. Berl. Bot. Gart. 1:322. 1897.

A glabrous shrub, 1–3 m. high, the rather stout branches densely leafy. Leaves various, narrowly oblong to oblanceolate or obovate, coriaceous, shining above, sometimes fascicled, 7–15 cm. long, 1–5 cm. wide, the apex acute or acuminate, narrowed to an obtuse base, the venation ascending, the stout petioles 3–6 mm. long; flowers umbellate or solitary, terminal or also axillary, short-pedicelled; calyx nearly tubular, 3–4.5 cm. long, irregularly cleft nearly to the middle, its lobes acutish; corolla white, its rather stout puberulent tube 6–8 cm. long, its limb about 5 cm. broad or broader; fruit subglobose, nearly 3 cm. in diameter.

Forests at middle and higher elevations in the eastern mountains of Porto Rico. Endemic.

4. **Brunfelsia densifolia** Krug & Urban, Not. Berl. Bot. Gart. 1: 324. 1897.

A tree, 6–10 m. high, glabrous, the densely leafy branches virgate. Leaves linear-oblong to linear-oblanceolate, coriaceous, shining, 5–11 cm. long, about 1 cm. wide or less, the apex acute or obtuse, the base long-attenuate, the petioles 4–9 mm. long, the venation nearly parallel; flowers solitary, terminal, the peduncle 1 cm. long or shorter; calyx narrowly campanulate, about 7 mm. long, its short lobes rounded; corolla white, fading yellow, its very slender tube 10–14 cm. long, its short, obtuse or rounded lobes about 12 mm. long; stamens unilaterally affixed, 2 fertile, 2 sterile; fruit ovoid, rounded, 2.5 cm. long.

Serpentine hillsides at higher elevations in the western districts of Porto Rico. Endemic. Urban suggested that this very interesting tree might represent a distinct genus, *Brunfelsiopsis* Urban.

Brunfelsia undulata Sw., endemic in Jamaica, was erroneously recorded by Krebs from St. Thomas.

Cyphomandra betacea (Cav.) Sendtn. PALO DE TOMATE, TREE TOMATO. [*Solanum betaceum* Cav.] a tree, native of Mexico, reaching a height of 8 meters or more, occasionally planted for its edible fruit in Porto Rico, has large entire ovate cordate leaves, pink cymose flowers and large red berries.

Petunias of several races, with white to violet or variegated flowers, often double, are grown for ornament in Porto Rico and Virgin Island gardens.

Family 9. **SCROPHULARIACEAE** Lindl.

FIGWORT FAMILY.

Herbs, shrubs or trees, with estipulate leaves, and perfect, mostly complete and irregular flowers. Calyx inferior, persistent, of five, or occasionally four, distinct or partly united sepals, which are valvate or imbricate in the bud. Corolla gamopetalous, the limb 2-lipped, or nearly regular. Stamens 2, 4 or 5, didynamous, or nearly equal, inserted on the corolla and

alternate with its lobes; anthers 2-celled; the sacs equal, or unequal, or sometimes confluent into one. Disk present or obsolete. Pistil 1, entire or 2-lobed; ovary superior, 2-celled, or rarely 1-celled; ovules anatropous or amphitropous, on axile placentae; style slender, simple; stigma entire, 2-lobed or 2-lamellate. Fruit mostly capsular and septicidally or loculicidally dehiscent. Seeds mostly numerous; endosperm fleshy; embryo small, straight or slightly curved; cotyledons little broader than the radicle. About 200 genera and 3,000 species, widely distributed.

A. Posterior lobe of the corolla external in the bud; plants not parasitic.

1. Corolla not saccate anteriorly.

a. Stigma 2-lipped; inflorescence simply racemose; leaves glandular-punctate.

*Leaves alternate; corolla very nearly regular; stamens 5.
 **Leaves opposite; corolla irregular; stamens 2 or 4.

†Seeds not transversely lined.

‡Anther-sac approximate.

§Sepsals 4.

§§Sepsals 5.

Corolla yellow.

Corolla white or blue.

Stamens 4.

Outer sepal veinless or obscurely veined; creeping plants.

Sepsals obtuse; styles distinct above.

Sepsals acute; styles wholly united.

Outer sepal reticulate-veined; erect plants.

Stamens 2.

‡‡Anther-sacs separated; seeds longitudinally striate; stamens 4.

Pedicels 2-bracteolate; leaves clasping.

Pedicels ebracteolate; leaves pctioled.

††Seeds finely transversely lined or wrinkled.

Perfect stamens 4.

Perfect stamens 2.

Corolla much longer than the calyx.

Corolla minute, 1-2 mm. long.

Sepsals united at the base only.

Sepsals united over half their length.

b. Stigma capitate; inflorescence paniculate; leaves not glandular-punctate.

Filaments 5, the posterior one scale-like; large-leaved herbs.

Filaments 4; small-leaved herbs or shrubs.

2. Corolla saccate anteriorly.

B. Anterior lobes of the corolla external in the bud; plants mostly root-parasites.

Corolla-tube campanulate or subglobose.

Corolla-tube scarcely longer than the calyx.

Corolla-tube much longer than the calyx.

Corolla salverform.

1. *Capraria*.

2. *Scoparia*.

3. *Mecardonia*.

4. *Macuillamia*.

5. *Bramia*.

6. *Caconapea*.

7. *Herpestis*.

8. *Stemodia*.

9. *Lendneria*.

10. *Vandellia*.

11. *Ilysanthes*.

12. *Globifera*.

13. *Hemianthus*.

14. *Scrophularia*.

15. *Russellia*.

16. *Angelonia*.

17. *Melasma*.

18. *Agalinis*.

19. *Buchnera*.

1. **CAPRARIA** L. Sp. Pl. 628. 1753.

Perennial herbs or shrubby plants. Leaves alternate, longer than broad, toothed. Flowers on axillary pedicels. Calyx of 5 narrow, almost equal sepals. Corolla white, campanulate, with 5 flat lobes. Stamens usually 5; anther-sacs 2, divergent, confluent. Stigmas dilated or 2-lobed. Capsule short, 2-grooved, loculicidally dehiscent. Seeds reticulated. [Latin, from *capra*, a nanny-goat.] About 4 species, of tropical and subtropical America, the following typical.

1. ***Capraria biflora*** L. Sp. Pl. 628. 1753.

Capraria biflora pilosa Griseb. Fl. Br. W. I. 427. 1861.

Stems 3-9 dm. tall, branching, sometimes pubescent. Leaves oblanceolate, cuneate or oblong, 1-4 cm. long, acute, sharply serrate above the middle; pedicels

solitary or 2 together, shorter than the leaves; sepals linear-lanceolate to linear-subulate, 4–6 mm. long; corolla about 1 cm. long, the tube campanulate, the lobes lanceolate, about as long as the tube; capsule oval or oval-ovoid, about as long as the sepals.

Banks, fields, waste and cultivated grounds, Porto Rico, Mona; Icacos; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Florida; Texas; Bermuda; West Indies; Mexico and continental tropical America. GOAT-WEED. TE DEL PAIS.

2. **SCOPARIA** L. Sp. Pl. 116. 1753.

Herbs or low shrubs, mostly branched, with opposite or verticillate, punctate leaves, and small bractless pedicelled flowers solitary or in pairs in the axils. Calyx 4-parted, the segments nearly distinct, imbricated. Corolla nearly rotate, 4-cleft, densely bearded in the throat, its lobes nearly equal, obtuse. Stamens 4, nearly equal; filaments filiform; anther-sacs distinct, parallel or divergent. Style clavate above; stigma truncate or notched; ovules many. Capsules septicidally dehiscent, its valves entire, membranous. Seeds many angular. [Latin, a broom.] About 20 species, of tropical and subtropical America, the following typical one also widely distributed in warm and tropical parts of the Old World.

1. **Scoparia dulcis** L. Sp. Pl. 116. 1753.

Annual, glabrous, often much branched, 3–10 dm. high, the branches slender. Leaves ovate to oblong-lanceolate, opposite or verticillate in 3's or 4's, serrate or the upper ones entire, short-petioled, acute at the apex, narrowed or cuneate at the base, the lower 2–3 cm. long, the upper smaller; pedicels filiform, as long as the upper leaves or shorter, often borne in most of the axils; sepals oblong or oblong-obovate, acute, sometimes ciliolate, about 1.5 mm. long; corolla white, 3–4 mm. wide; capsule ovoid-globose, a little longer than the sepals.

Moist or wet grounds, Porto Rico, Moña; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—southern United States; West Indies; continental tropical America and Old World tropics. ESCOBITA AMARGA. OROZUZ. LICORICE WEED.

3. **MECARDONIA** Ruiz & Pavon, Syst. 164. 1798.

Perennial, erect or diffuse, low herbs, with opposite serrate pinnately veined leaves, and solitary axillary slender-peduncled yellow flowers. Sepals 5, unequal, the upper one the largest. Corolla 2-lipped, the upper lip emarginate. Stamens 4, borne on the throat of the corolla. Disk wanting. Stigma 2-lobed. Capsule septicidally dehiscent. Seeds numerous. [Commemorates Meca y Cardona, a founder of the Botanical Garden of Barcelona.] About 10 species of tropical and subtropical America. Type species: *Mecardonia ovata* Ruiz & Pavon.

1. **Mecardonia procumbens** (Mill.) Small, Fl. SE. U. S. 1065, 1338. 1903.

Erinus procumbens Mill. Gard. Dict. ed. 8, no. 6. 1768.

Lindernia dianthera Sw. Prodr. 92. 1788.

Herpestis chamaedryoides H. B. K. Nov. Gen. 2: 369. 1818.

Monniera dianthera Millsp. Field Mus. Bot. 2: 98. 1900.

Bacopa chamaedryoides Cook & Collins, Contr. U. S. Nat. Mus. 8: 88. 1903.

Glabrous, usually branched from the base, the branches decumbent or sub-erect, 1.5–4 dm. long. Leaves ovate or oval, 1–2 cm. long, serrate, short-petioled, darkening in drying; peduncles slender, as long as the leaves or longer, sometimes

3 times as long; upper sepal at length 8–10 mm. long; corolla about 10 mm. long; capsule oblong, 6–10 mm. long.

Wet or moist grounds at lower elevations, Porto Rico; St. Croix:—Florida; Bahamas; Jamaica; Cuba; Hispaniola; Antigua; Grenada; Tobago; Trinidad; continental tropical America. YERBA DE CULEBRA AMARILLA.

4. **MACUILLAMIA** Raf. Autik. Bot. 44. 1840.

Aquatic or uliginous herbs, with small thin opposite sessile or short-petioled leaves and small axillary solitary peduncled flowers. Sepals somewhat unequal, obtuse, about as long as the capsule. Corolla white, tubular-campanulate, a little irregular. Stamens 4. Styles distinct at the apex. Capsule rounded, thin-walled. [Derivation not cited.] A few species of temperate and tropical America. Type species: *Monniera rotundifolia* Michx.

1. **Macuillamia repens** (Sw.) Pennell, Proc. Acad. Phila. 75: 9. 1923.

Gratiola repens Sw. Prodr. 14. 1788.

Herpestis obovata Poepp.; Schl. & Cham. Linnaea 5: 107. 1830.

Herpestis repens Schl. & Cham. Linnaea 5: 107. 1830.

Monniera obovata Kuntze, Rev. Gen. Pl. 463. 1891.

Stems glabrous or pubescent, fistulose, about 4 dm. long or shorter. Leaves obovate-elliptic, 7-nerved, sessile, 8–20 mm. long, the apex rounded, the base narrowed; peduncles slender, shorter than the leaves; sepals about 4 mm. long in fruit, the outer ovate, the inner lanceolate; corolla-tube scarcely longer than the calyx, the limb 4-parted, the upper lobe erect, emarginate, the others ovate, spreading; filaments subulate; anthers ovate; capsule 3–4 mm. long. [*Herpestis rotundifolia* of Grisebach, not of Pursh.]

Ditches and wet meadows near Yabucoa and Calabazas, Porto Rico:—Cuba; Hispaniola; Trinidad; South America.

5. **BRAMIA** Lam. Encycl. 1: 459. 1785.

Diffuse or prostrate herbs, with opposite, mostly entire, obtuse, palmately veined leaves, and small peduncled flowers, mostly solitary in the axils, the peduncles 2-bracteolate. Calyx subtended by 2 bracts, 5-parted, the upper segment the broadest. Corolla nearly regular, the tube cylindric, the limb nearly equally 5-lobed. Stamens 4, didynamous, included. Style slender; stigma capitate, or 2-lobed. Seeds numerous. [From Brama, a Malabar name.] A few species of warm and tropical regions. Type species: *Bramia indica* Lam.

1. **Bramia Monnieri*** (L.) Drake, Pl. Polyn. Franc. 142. 1892.

Lysimachia Monnieri L. Cent. Pl. 2: 9. 1756.

Gratiola Monnieri L. Syst. ed. 10, 851. 1759.

Herpestis Monniera H.B.K. Nov. Gen. 2: 366. 1818.

Bacopa Monniera Wettst. in E. & P. Nat. Pflanzf. 4^{3b}: 77. 1891.

Monniera calycina Kuntze, Rev. Gen. Pl. 462. 1891.

Monniera Monniera Britton, Mem. Torr. Club 5: 292. 1894.

Perennial, glabrous, fleshy; stem creeping, rooting at the nodes, 1.5–5 dm. long. Leaves spatulate or cuneate-obcordate, sessile, rounded at the apex, entire, or sparingly denticulate, 6–20 mm. long; peduncles mainly in alternate axils, 2-bracteolate at the summit, in fruit longer than the leaves; flowers pale blue,

*Spelled *Monniera* by Drake.

about 1 cm. broad; upper calyx-segment ovate, acute; corolla obscurely 2-lipped; stamens nearly equal; capsule ovoid, acute, shorter than the calyx.

Wet grounds at lower elevations, especially in subsaline soil, Porto Rico; Mona; Icacos; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—southeastern United States; Bermuda; West Indies, continental tropical America and Old World tropics. YERBA DE CULEBRA.

6. **CACONAPEA** Cham. *Linnaea* **8**: 28. 1833.

Erect or ascending herbs, with opposite membranous serrate leaves, the small flowers axillary or in terminal leafy-bracted racemes. Sepals 5, unequal, the outer one ovate, reticulate-ridged, longer than the much narrower inner ones. Corolla violet or white, tubular-campanulate, 2-lipped, the upper lip broad, emarginate. Stamens 4; anther-sacs proximate. Capsule firm-walled, about as long as the calyx or shorter. [Name said to be Brazilian.] Twelve species or more, natives of tropical regions, mostly American. Type species: *Caconapea gratioides* Cham.

1. **Caconapea stricta** (Schrad.) Britton.

Herpestis stricta Schrad.; Link, *Enum.* **2**: 142. 1822.

Monniera stricta Kuntze, *Rev. Gen. Pl.* 463. 1891.

Bacopa stricta Robinson, *Proc. Am. Acad.* **44**: 615. 1909.

Glabrous, or puberulent above, erect or nearly so, often much branched, 2–6 dm. high, the stem stout, the branches slender. Leaves thin, oblong-lanceolate to ovate-lanceolate, 2–12 cm. long, serrate except near the base, the apex bluntly acuminate or acute, the base narrowed or cuneate, the petioles 3–25 mm. long; flowers fascicled in the axils or sometimes solitary, rarely in short interrupted racemes; pedicels very slender, puberulent, 3–6 mm. long, 2-bracteolate at the apex; fruiting calyx about 6 mm. long; corolla white or violet, its tube a little longer than the calyx; capsule shorter than the calyx.

Wet grounds, Porto Rico, ascending to higher elevations; recorded from St. Thomas, presumably erroneously:—Hispaniola; Brazil; Erroneously recorded by Kuntze as *Delileia biflora* (L.) Kuntze, a plant not found in Porto Rico.

7. **HERPESTIS** Gaertn. f. *Fr. & Sem.* **3**: 186. 1807.

Small creeping or aquatic herbs, with opposite entire leaves and solitary axillary short-peduncled flowers. Sepals 5, unequal, the outer one reticulate-veined, deeply cordate. Corolla white, tubular-campanulate, irregular. Stamens 2; anther-sacs approximate. [Greek, creeping.] A monotypic genus.

1. **Herpestis rotundifolia** Gaertn. f. *Fr. & Sem.* **3**: 187. 1807.

Glabrous, branched from the base and matted, the branches prostrate, rooting at the lower nodes, 1–2.5 dm. long. Leaves ovate or elliptic, sessile, 5–12 mm. long, 5–7-nerved, subamplexicaul, the apex rounded; peduncles 3–6 mm. long, ebracteolate; outer sepal strongly veined, ovate-orbicular, rounded, 4–5 mm. long, much longer than the capsule; corolla scarcely longer than the outer sepal.

Border of Laguna Yeguada, northern coastal plain of Porto Rico, 1922:—Southeastern United States; Cuba; Guadeloupe.

8. **STEMODIA** L. *Syst. ed.* 10, 1118. 1759.

Herbs or low shrubs, mostly glandular-pubescent and odorous, with opposite or verticillate sessile clasping leaves, the flowers solitary in the axils or in ter-

minal, often leafy-bracted spikes or racemes. Pedicels 2-bracteolate. Calyx 5-parted, the sepals imbricated, nearly distinct and equal. Corolla with a nearly cylindric tube and a 2-lipped limb, the upper lip notched or entire, erect, the lower 3-lobed. Stamens 4, didynamous, included; filaments filiform; anther-sacs distinct, stipitate. Capsule attenuate, 2-valved, the valves 2-cleft. Seeds striate, tuberculate, small. [Greek, double stamens.] About 20 species, of tropical and subtropical regions, the first following one typical.

Corolla glabrous; bractlets lanceolate to ovate; leaves 1–2.5 cm. long.
Corolla glandular-pubescent; bractlets linear; leaves 3–9 cm. long.

1. *S. maritima*.
2. *S. durantifolia*.

1. **Stemodia maritima** L. Syst. ed. 10, 1118. 1759.

Pubescent or puberulent and somewhat viscid, usually much branched, 6 dm. high or less, the branches decumbent or ascending, leafy. Leaves opposite, oblong or oblong-lanceolate, 1–2.5 cm. long, serrate, sessile, acutish at the apex, cordate at the base; flowers nearly sessile in the axils, solitary, shorter than the leaves; calyx about 2 mm. long, shorter than the lanceolate to ovate bractlets; corolla purplish, glabrous, longer than the calyx, its upper lip nearly entire.

Thicket, lagoon near Salinas, Porto Rico; St. Thomas (ex Krebs):—Bahamas; Jamaica; Cuba; Hispaniola; Curaçao; northern South America.

2. **Stemodia durantifolia** (L.) Sw. Obs. 240. 1791.

Capraria durantifolia L. Syst. ed. 10, 1116. 1759.

Pubescent and glandular, erect, often much branched, 3–9 dm. high, the branches slender. Leaves oblong, oblong-lanceolate, oblanceolate, or the upper ones linear, acute, acuminate or obtuse, serrate, sessile and amplexicaul, those of the stem 3–9 cm. long, with narrowed bases, the upper much smaller; flowers nearly sessile, solitary in the axils, or forming narrow long leafy-bracted racemes; bractlets linear, shorter than the calyx; sepals about 5 mm. long, lanceolate, acuminate; corolla blue or purple, glandular-pubescent, longer than the calyx.

Wet grounds at low elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Antigua to Trinidad; Curaçao; continental tropical America. VERONICA.

9. **LENDNERIA** Minod, Bull. Soc. Bot. Geneve II. 10: 240. 1918.

Herbs, with opposite or verticillate petioled leaves, and mostly small blue or white, axillary flowers, the pedicels ebracteate. Sepals nearly equal and alike. Corolla-tube nearly cylindric, the limb 2-lipped. Stamens 4, didynamous; anther-sacs separated, stipitate. Capsule pointed. Seeds smooth. [In honor of Professor A. Lindner.] About 10 species of tropical America, the following typical.

1. **Lendneria verticillata** (Mill.) Britton

Erinus verticillatus Mill. Gard. Dict. ed. 8, no. 5. 1768.

Capraria humilis Soland. in Ait. Hort. Kew. 2: 354. 1789.

Stemodia parviflora Ait. Hort. Kew. ed. 2, 4: 52. 1812.

Lendneria humilis Minod, Bull. Soc. Bot. Geneve II. 10: 240. 1918.

Annual, diffusely branched, glandular-pubescent, 5–15 cm. high. Leaves opposite, or verticillate in 3's or 4's, 10–16 mm. long, obtuse, crenate-serrate above the cuneate base, the petioles slender, about as long as the blades or shorter; flowers short-peduncled in the axils; sepals linear-lanceolate, acuminate,

4–5 mm. long; corolla blue or purple, about as long as the sepals; capsule subglobose, tipped, 2.5–3 mm. in diameter.

Waste or cultivated ground, Rio Piedras, Porto Rico. collected by Stevenson in 1914.—Jamaica; Cuba; Hispaniola; Antigua; Guadeloupe; Martinique; St. Vincent; Trinidad; continental tropical America.

10. **VANDELLIA** Brown; L. Mant. 1: 12, 89. 1767.

Low annual branched herbs, with opposite dentate pinnately veined leaves and small solitary axillary flowers. Calyx 5-toothed, the teeth somewhat irregular. Corolla 2-lipped, the posterior lip exterior in the bud. Stamens 4, didynamous, the filaments of two anterior ones with a basal tooth; anther-sacs approximate. Capsule narrow, longer than the calyx. [Commemorates Vandelli, professor in Coimbra.] A few species of tropical regions, the following typical.

1. **Vandellia diffusa** L. Mant. 1: 89. 1767.

Diffusely spreading, pubescent, branched, the 4-angled branches slender; 6–15 cm. long. Leaves ovate to suborbicular, very short-petioled, low-dentate, 8–20 mm. long, the apex rounded, obtuse or acutish, the base obtuse or rounded, peduncles very short; calyx-tube narrowly obpyramidal, 3–4 mm. long, its lanceolate acuminate teeth about 2 mm. long; corolla white, about 5 mm. long; capsule narrowly oblong, attenuate, tipped, 8–11 mm. long.

Local in waste and cultivated grounds, Porto Rico; St. Thomas (type locality, but not recently collected there); St. Croix (collected long ago by Ryan, according to Eggers); —Jamaica; Cuba; Guadeloupe, Montserrat; Dominica; Grenada; Trinidad; continental tropical America; Old World tropics.

11. **ILYSANTHES** Raf. Ann. Nat. 13. 1820.

Annual or biennial glabrous slender herbs, with opposite, mostly dentate and sessile leaves, and small purplish peduncled flowers solitary in the axils. Calyx 5-parted, the segments linear. Corolla irregular, the tube somewhat expanded above, the limb 2-lipped; upper lip 2-cleft, erect; lower lip larger, 3-lobed, spreading. Fertile stamens 2, included, their anther-sacs divergent; sterile stamens 2, 2-lobed, one of the lobes capitate-glandular, the other glabrous, shorter. Style slender; stigma slightly 2-lobed. Capsule septicidally dehiscent. Seeds numerous, wrinkled. [Greek, mud-flower.] About 10 species, of wide distribution. Type species: [*Ilysanthes riparia* Raf.]

1. **Ilysanthes dubia** (L.) Barnhart, Bull. Torr. Club 26: 376. 1899.

Gratiola dubia L. Sp. Pl. 17. 1753.

Capraria gratioloides L. Syst. ed. 10, 1117. 1759.

Ilysanthes gratioloides Benth. in DC. Prodr. 10: 419. 1846.

At length diffusely branched, 0.7–2 dm. long. Leaves ovate, ovate-oblong, or the lower obovate, sessile, or slightly clasping at the base, remotely denticulate or entire, thickish, 3–7-nerved, 1–3 cm. long, the upper ones commonly much smaller; peduncles slender; flowers 6–10 mm. long; sepals linear, about one-half the length of the corolla; capsule narrowly ovoid-oblong, bluntish, 4–6 mm. high; seeds 2 mm. long, reddish. [*I. riparia* of Cook and Collins.]

Wet grounds, Porto Rico, at lower and middle elevations:—eastern United States; Cuba; recorded from Hispaniola; South America; introduced into France and Japan. YERBA GRACIOSA.

12. **GLOBIFERA** J. F. Gmelin, Syst. 2: 32. 1791.

Creeping or ascending, small leafy annual glabrous herbs, with opposite obovate, oval or orbicular sessile entire leaves, and minute white or purplish short-peduncled flowers, solitary in the axils. Calyx 4-5-lobed or 4-5-parted. Corolla irregular, the tube short, the upper lip shorter than the lower, or wanting, the lower 3-lobed, the middle lobe the largest. Stamens 2, anterior; filaments short, somewhat dilated or appendaged at the base; anthers small, their sacs distinct, parallel, or slightly divergent. Style short; stigma 2-lobed. Capsule globose, 2-celled by a membranous partition, or becoming 1-celled. Seeds numerous, minute. [Latin, globe-bearing.] A few American species, the following typical.

1. **Globifera umbrosa** (Walt.) J. F. Gmelin, Syst. 2: 32. 1791.

Anonymos umbrosa Walt. Fl. Car. 63. 1788.

Micranthemum orbiculatum Michx. Fl. Bor. Am. 1: 10. 1803.

Stems very slender, creeping, or the tips ascending, tufted, 1-4 dm. long. Leaves orbicular, rounded or retuse, 4-10 mm. in diameter; peduncles very short, shorter than the calyx; calyx-lobes oblong, 1-1.5 mm. long; corolla about 1.5 mm. broad; capsule 1-1.5 mm. in diameter.

Ditches and wet grounds, Los Mameyes, Porto Rico, collected by Eggers in 1883:—southeastern United States; Cuba; Hispaniola; Guadeloupe; Grenada; Trinidad; Mexico; tropical South America.

13. **HEMIANTHUS** Nutt. Journ. Acad. Phila. 1: 119. 1817.

Diminutive prostrate herbs, often rooting at the nodes, with opposite entire 3-nerved leaves, and minute solitary, nearly sessile or peduncled flowers. Calyx deeply cleft, 4-lobed. Corolla (in our species) 1-lipped, the lip 3-lobed, its middle lobe somewhat longer than the lateral ones. Stamens 2, borne on the throat of the corolla; filaments short, with a basal appendage; staminodes none. Style 2-cleft above the middle. Capsule globose, 2-valved, membranous. Seeds several or many, few-ribbed and transversely striate. [Greek, referring to the deficient corolla.] About 10 species, natives of temperate and tropical America. Type species: *Hemianthus micranthemoides* Nutt.

1. **Hemianthus callitrichoides** Griseb. Mem. Am. Acad. II. 8: 522. 1862.

Hemisiphonia antillana Urban, Symb. Ant. 6: 41. 1909.

Glabrous; matted; stems filiform, 2-4 cm. long. Leaves elliptic, membranous, sessile, about 3 mm. long, rounded or obtuse at the apex; peduncles filiform 1-3 mm. long; calyx about 1 mm. long; lobes of the corolla-lip oblong.

In mountain streams, Porto Rico:—Bahamas; Jamaica; Cuba; Hispaniola.

14. **SCROPHULARIA** L. Sp. Pl. 619. 1753.

Perennial herbs, some exotic species shrubby, with mostly opposite leaves, and small purple greenish or yellow flowers, in terminal racemose or paniced cymes or thyrses. Calyx 5-parted or 5-cleft, the segments or lobes mostly obtuse. Corolla irregular, the tube globose to oblong, not gibbous nor spurred, the limb 5-lobed, the 2 upper lobes longer, erect, the lateral ones ascending, the lower

spreading or reflexed. Stamens 5, 4 of them anther-bearing and didynamous, declined, their anther-sacs confluent into one, the fifth sterile, reduced to a scale on the roof of the corolla-tube. Style filiform; stigma capitate or truncate. Capsule ovoid, septicidally dehiscent. Seeds rugose, not winged. [Named for its repute as a remedy for scrofula.] About 120 species of the northern hemisphere. Type species: *Scrophularia nodosa* L.

1. **Scrophularia minutiflora** Pennell, Proc. Acad. Phila. 75: 18. 1923.

Scrophularia micrantha Desv. in Ham. Prodr. 47. 1825. Not Urville, 1822.

Annual, erect or decumbent, glabrous or sparingly pilose, simple or little branched, about 5 dm. high or less. Leaves membranous, ovate, slender-petioled, coarsely dentate, 3–8 cm. long, the apex acute, the base narrowed or subtruncate; inflorescence interruptedly racemose; flowers 1–7 in the clusters; pedicels nearly filiform, 3–10 mm. long; sepals linear-lanceolate, acute, about 2.5 mm. long; corolla white, about 3 mm. long, the tube subglobose, the 5 nearly equal lobes rounded; stamens, staminodium and style filiform; capsule ovoid, pointed, about 4 mm. long.

Shaded banks and forests, Porto Rico, at middle and higher elevations in moist or wet parts of the central and western districts:—Cuba; Hispaniola. PEREGIL CIMARRONA.

15. **RUSSELLIA** Jacq. Enum. 6, 25. 1760.

Shrubby or herbaceous plants, with opposite or whorled leaves, sometimes reduced to mere scales, and cymose or paniced, mostly showy flowers. Calyx-lobes ovate. Corolla tubular, or tubular-funnelform, the tube long, the lobes short, somewhat unequal. Stamens 4, with divergent anther-sacs; no staminodes. Capsule ovoid to globose. [In honor of Alexander Russell, English physician and traveller, who died in 1768.] About 15 species, natives of tropical America. Type species: *Russellia sarmentosa* Jacq.

1. **Russellia equisetiformis** Schl. & Cham. Linnaea 6: 377. 1831.

Russellia juncea Zucc. Flora 15: Beibl. 99. 1832.

A glabrous, much-branched shrub, 4–12 dm. high, with spreading or arching striate branches, the twigs very slender. Leaves of the stem and branches, or most of them, reduced to acute scales about 2 mm. long, those of sterile twigs spatulate, 1.5 cm. long or less; calyx about 4 mm. long; corolla bright red, about 2.5 cm. long, its lobes ovate, 4–6 mm. long; capsule ovoid.

Occasionally spontaneous in Porto Rico after cultivation for ornament; Tortola; commonly planted and luxuriant in Porto Rico and Virgin Island gardens:—Florida; Bermuda; Jamaica; Barbados. Native of Mexico. LLUVIA DE CORAL. CORAL DE ITALIA. FOUNTAIN-PLANT. MADEIRA PLANT.

Russellia sarmentosa Jacq., seen as a young plant at the Trujillo Plant Propagation Station in 1925, has ovate crenate leaves 2–5 cm. long.

16. **ANGELONIA** H. & B. Pl. Aequin. 2: 92. 1809.

Herbs, with opposite leaves, or the upper alternate, the often showy blue or violet flowers solitary in the axils, or in terminal racemes. Calyx 5-cleft or 5-parted. Corolla subrotate, irregular, 5-lobed, the 2 posterior lobes external in the bud, the short tube anteriorly saccate, the anterior lobes with a horn-like

appendage at the base. Stamens 4, didynamous; filament short; anther-sacs divaricate. Ovules many. Capsule 2-valved. Seeds foveolate. [From the Venezuelan name *ANGELON*]. About 25 species, natives of tropical America, the following typical.

1. ***Angelonia salicariaefolia*** H. & B. Pl. Aequin. 2: 92. 1809.

Erect, glandular-pubescent and viscid, branched or simple, 3–6 dm. high. Leaves lanceolate to linear-oblong, serrate, 3–7 cm. long or the upper much smaller, subsessile, acute or acuminate; flowers in leafy-bracted, often elongated racemes; pedicels slender, about as long as the bracts or longer, recurved in fruit, densely glandular-pubescent; calyx oblique, 3–4 mm. long; corolla blue, 1.5–2 cm. broad, its lower lobes oblong, rounded; capsule globose, about 6 mm. in diameter.

Banks and roadsides in moist districts, Porto Rico:—Hispaniola; Trinidad; northern South America.

Angelonia angustifolia Benth., of Cuba, Hispaniola and Mexico, *VIOLETA*, frequently grown in flower gardens in Porto Rico and the Virgin Islands, is glabrous, with linear leaves, the flowers similar to those of *A. salicariaefolia*, the lower corolla-lobes obovate.

17. **MELASMA** Berg. Descr. Pl. Cap. 162. 1767.

Pubescent or hirsute herbs, parasitic on roots, with opposite, mostly dentate leaves often darkening in drying, the small flowers axillary or forming terminal bracted spikes or racemes. Calyx campanulate, 5-cleft. Corolla-tube subcampanulate, short, its limb oblique, spreading, the anterior lobes exterior in the bud. Stamens 4, didynamous; anther-sacs parallel. Style mostly elongated. Capsule subglobose. Seeds numerous, linear. [Greek, black.] About 20 species, natives of tropical regions. Type species: *Melasma scabrum* Berg.

1. ***Melasma melampyroides*** (L. C. Rich.) Pennell.

Pedicularis melampyroides L. C. Rich. Act. Soc. Hist. Nat. Paris 1: 111. 1792.

Alectra brasiliensis Benth. in DC. Prodr. 10: 339. 1846.

Alectra melampyroides Kuutze, Rev. Gen. Pl. 2: 458. 1891.

Annual, scabrous-hirsute, erect, simple or branched, 3–8 dm. high. Leaves triangular-lanceolate, subsessile, dentate, 2–5 cm. long, or the upper much smaller, the apex acuminate, the base truncate or subcordate; flowers solitary and sessile in the axils and forming a leafy-bracted terminal spike; calyx about 8 mm. broad, the corolla nearly or quite included, yellow.

Wet grounds, Porto Rico, at lower and middle elevations:—Guadeloupe to Trinidad; northern South America. Recorded from Jamaica. YERBA DE HIERRO.

18. **AGALINIS** Raf. N. Fl. 2: 61. 1837.

Erect herbs, mainly with opposite and sessile narrow leaves. Flowers showy, usually large, purple, pink or white, in loose bracted racemes. Calyx campanulate, 5-toothed or 5-lobed. Corolla somewhat irregular, campanulate, the tube broad, the limb 5-lobed, slightly 2-lipped, the anterior lobes exterior in the bud. Stamens 4, didynamous, included; filaments pubescent; anthers 2-celled, their sacs obtuse or mucronate at the base; style filiform. Capsule

loculicidally dehiscent, many-seeded. Seeds mostly angled. [Greek, remarkable flax.] Fifty species or more, natives of continental North America and the West Indies. Type species: *Agalinis palustris* Raf.

1. **Agalinis fasciculata** (Ell.) Raf. N. Fl. 2: 63. 1837.

Gerardia fasciculata Ell. Bot. S. C. & Ga. 2: 115. 1822.

Gerardia domingensis Spreng. Syst. 2: 807. 1825.

Erect, branched, 2–10 dm. high, puberulent and scabrous, the branches slender. Leaves narrowly linear, 1.5–3 cm. long, about 1.5 mm. wide or narrower, acute, scabrous, mostly with fascicles of shorter ones in their axils; pedicels shorter than or exceeding the calyx; calyx-tube about 3 mm. long, its 5 short teeth ovate, acute; corolla purple, 1.5–2.5 cm. broad, puberulent without, pubescent within; capsule globose, 4–5 mm. in diameter.

Grassy banks and fields in wet or moist districts at lower and middle elevations, Porto Rico:—southern United States; Cuba (ex Urban); Hispaniola. YERBA VERONICA.

Agalinis purpurea (L.) Pennell, of the eastern United States and Cuba, was doubtfully recorded by Pennell as occurring in Porto Rico, after study of a specimen from Guayama. It differs from *A. fasciculata* by having no fascicles of small leaves in the axils of the larger ones, and in the nearly glabrous stem.

19. **BUCHNERA** L. Sp. Pl. 630. 1753.

Erect, perennial or biennial, strict hispid or scabrous herbs, blackening in drying, the lower leaves opposite, the upper sometimes alternate. Flowers rather large, white, blue, or purple, in terminal bracted spikes, the lower commonly distant. Calyx tubular, or oblong, 5–10-nerved, 5-toothed. Corolla salverform, its tube cylindric, somewhat curved, its limb nearly equally 5-cleft, spreading, the anterior lobes exterior in the bud. Stamens 4, didynamous; anthersacs confluent into 1. Style slender, thickened or club-shaped above; stigma small, entire or emarginate. Capsule loculicidally dehiscent. Seeds numerous, reticulated. [Named for J. G. Buchner.] About 30 species, of warm and temperate regions. Type species: *Buchnera americana* L.

1. **Buchnera elongata** Sw. Prodr. 92. 1788.

Stems rough-hispidulous, 2–5 dm. high, simple or branched above, slender. Leaves scabrous, sparingly toothed or entire, the basal ones obovate or oblong, short-petioled, 1–3 cm. long, those of the stem oblong to linear, 1.5–8 cm. long; spikes slender, distantly flowered; calyx 5–6 mm. long, hispidulous, its upper lobes triangular, acute; corolla blue or white, 9–12 mm. long, its tube somewhat pubescent; capsules ovoid, 5–7 mm. long.

Wet sandy soil near Bayamon, collected by Stahl and recorded from Miradero by Bello:—Florida; Bahamas; Jamaica; Cuba; Hispaniola. ESPIGA DE SAN ANTONIO.

Maurandya erubescens (Don) A. Gray, Mexican, is a long pubescent vine, with petioled, triangular-hastate leaves and solitary axillary, long-peduncled rose-red flowers about 7 cm. long, the corolla saccate at the base. It is occasionally grown for ornament in Porto Rico. [*Lophospermum erubescens* Don.]

Maurandya Barclayana Lindl., FAIRY IVY, also Mexican, recorded by Eggers as grown in the Virgin Islands, is a slender glabrous vine, with smaller leaves, the purple flowers 2.5–3 cm. long.

Maurandya antirrhiniflora (H. & B.) Willd., ROVING SAILOR, Mexican, observed growing freely on walls at Louisenhøj, St. Thomas, in 1925, is a short slender glabrous vine, with slender-petioled, triangular-hastate leaves 1–5 cm. long and solitary axillary peduncled flowers, the purple corolla about 1.5 cm. long, the depressed-globose capsule about 1 cm. in diameter. [*Usteria antirrhiniflora* Poir.]

Antirrhinum majus L., SNAPDRAGON, European, grown for ornament in Porto Rico and Virgin Island gardens, is perennial, with narrow leaves, and terminal racemes of large flowers, white to purple, 2–3 cm. long, the corolla saccate at the base, 2-lipped with a large palate.

Family 10. LENTIBULARIACEAE Lindl.

BLADDERWORT FAMILY.

Herbs growing in water or wet places. Leaves submersed and dissected, sometimes resembling rootlets and often bladder-bearing; or aerial, basal, entire; or, rarely wanting. Scapes naked or minutely scaly. Flowers irregular, perfect. Calyx of 2–5 herbaceous sepals. Corolla 2-lipped, the tube spurred or saccate. Stamens 2, adnate to the corolla-tube; anthers confluent 1-celled. Pistil solitary; ovary 1-celled, with a free-central placenta; stigma 2-lipped. Fruit a capsule. About 16 genera and 300 species, of world-wide distribution.

Bracts at the base of the pedicels without bractlets; calyx not enclosing the fruit.

Bracts flat, attached at the base; aquatic plants.

Bracts peltate; terrestrial plants.

Bracts with a pair of bractlets; calyx enclosing the fruit; terrestrial plants.

1. *Utricularia*.

2. *Setiscapella*.

3. *Stomosis*.

1. UTRICULARIA L. Sp. Pl. 18. 1753.

Aquatic herbs, the submersed stems with finely divided leaves bearing minute bladders. Flowers racemose or solitary at the summits of the scapes, each pedicel with a single bract at its base. Corolla strongly 2-lipped, with a prominent 2-lobed palate. [Latin, *utriculus*, a little bag.] About 75 species, of wide distribution. Known as BLADDERWORT. Type species, *Utricularia vulgaris* L.

1. *Utricularia obtusa* Sw. Prodr. 14. 1788.

Stems radiating from the base of the scape. Leaves scattered, sparingly divided; segments capillary, with few minute bladders; scapes 3–16 cm. high, 1–6-flowered; pedicels divergent, 1–10 mm. long; corolla yellow, 8–12 mm. long, the lower lip truncate, the spur subulate, acute, exceeding the lower lip; capsule about 3 mm. in diameter.

Creeping on the bottom in shallow water, at low elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Antigua; Guadeloupe; Martinique; continental tropical America.

2. SETISCAPELLA Barnh. in Small, Fl. Miami 170. 1913.

Terrestrial herbs, with short root-like branches from the base of the scape the delicate and evanescent leaves and minute bladders rarely seen. Flowers in zig-zag racemes or solitary at the summits of the wiry scapes, each pedicel with a single bract at its base; bracts and scales peltate. Sepals scarious, ribbed. Corolla 2-lipped, the lower lip divergently 3-lobed; palate prominently 2-lobed.

[Latin, *seta*, bristle, and *scapus*, scape.] About 12 species, in Asia, Africa, and America. Type species, *Utricularia subulata* L.

Scape with a pedicel in the axil of each bract; spur obtuse, little if at all exceeding the lower lip.

1. *S. subulata*.

Scape with empty bracts alternating with the pedicel-bearing ones; spur acute, much exceeding the lower lip.

2. *S. pusilla*.

1. **Setiscapella subulata** (L.) Barnh. in Small, Fl. Miami 170. 1913.

Utricularia subulata L. Sp. Pl. 18. 1753.

Stems and leaves usually evanescent before flowering time. Scapes 3–20 cm. high, filiform, 1–12-flowered; pedicels ascending, one from the axil of each bract; corolla yellow, 6–12 mm. long; spur obtuse, appressed to the lower lip and nearly or quite equalling it in length.

Wet sand, northern coastal plain of Porto Rico:—eastern United States; Cuba; Hispaniola; South America. GRASSILLA.

2. **Setiscapella pusilla** (Vahl) Barnhart.

Utricularia pusilla Vahl, Enum. 1: 202. 1804.

Stems and leaves usually evanescent before flowering time. Scapes 2–15 cm. high, filiform, 1–12-flowered; pedicels ascending, one from the axil of each alternating bract; corolla yellow, 4–6 mm. long; spur acute, appressed to and much exceeding the lower lip.

Wet sand, northern coastal plain of Porto Rico; also detected by Mrs. Britton, in February 1923, among mosses on the summit of Monte El Yunque:—Bahamas; Jamaica; Cuba; Trinidad; continental tropical America.

3. **STOMOISIA** Raf. Fl. Tell. 4: 108. 1838.

Terrestrial herbs, with short root-like branches from the base of the scape, the delicate and evanescent leaves and minute bladders rarely seen. Flowers racemose or subscapose, or solitary at the summits of the slender scapes, each pedicel with a bract and a pair of bractlets at its base. Sepals thin and veiny. Corolla strongly 2-lipped, the upper lip with a distinct claw, the lower consisting chiefly of the helmet-shaped, laterally compressed palate. [Greek, hairy mouth.] About 50 species, of wide distribution. Type species: *Utricularia cornuta* Michx.

1. **Stomoisia juncea** (Vahl) Barnh. in Small, Fl. Miami 171. 1913.

Utricularia juncea Vahl, Enum. 1: 202. 1804.

Scapes strict, erect, 1–4 dm. high, 1–12-flowered, bearing several or numerous small acute scales. Bracts 1–2 mm. long, acute, the bractlets similar but narrower; pedicels scarcely exceeding the bracts; calyx yellowish, the upper lobe acuminate, 4–5 mm. long, the lower acute, much shorter; corolla yellow, the lower lip 8–10 mm. long; spur subulate, pendent, 5–8 mm. long; capsule 2–3 mm. in diameter, closely invested by the calyx-lobes.

Wet sand, northern coastal plain of Porto Rico at Laguna Tortuguero and vicinity:—eastern United States; Cuba; Hispaniola; Trinidad; Guiana.

Family 11. **BIGNONIACEAE** Pers.

TRUMPET-CREEPER FAMILY.

Trees, shrubs or woody vines, a few species herbaceous, with opposite (rarely alternate) leaves, and mostly large, showy and clustered, more or

less irregular flowers. Calyx inferior, gamosepalous. Corolla gamopetalous, 5-lobed, somewhat 2-lipped, at least in the bud. Anther-bearing stamens 2 or 4, inserted on the tube of the corolla and alternate with its lobes; anthers 2-celled, the sacs longitudinally dehiscent. Disk annular or cup-like. Ovary mostly 2-celled; placentae parietal, or on the partition-wall of the ovary; ovules numerous, horizontal, anatropous; style slender; stigma terminal, 2-lobed. Capsule 2-valved, or fruit indehiscent. Seeds flat, transverse, winged in many genera; endosperm none; cotyledons broad and flat, emarginate or 2-lobed; radicle short, straight. About 60 genera and over 500 species of wide distribution in tropical regions, a few in the temperate zones.

A. Fruit capsular, dehiscent.

1. Climbing vines; capsule septifragal; leaflets 2-foliate or 3-foliate.

Tendrils without hooks, or wanting.

Flowers with a disk.

Calyx-limb not expanded.

Capsule linear, elongated; corolla purple.

Capsule oblong; corolla white.

Calyx-limb expanded; corolla purple.

Flowers without a disk; capsule linear, elongated; corolla white or purplish.

Tendrils (often fugacious) with 3 horny hooks; capsule linear, elongated; corolla yellow.

2. Trees or shrubs; capsule loculicidal.

Leaves palmately compound or unifoliate.

Leaves pinnate.

B. Fruit indehiscent; leaves simple.

Trees; ovary 1-celled; fruit large.

Fruit 2-celled; leaves alternate.

Fruit 1-celled; leaves mostly fascicled.

Climbing, often radicans vines with opposite leaves; ovary 2-celled; fruit small.

1. *Arrabidaea*.
2. *Distictis*.
3. *Amphilophium*.
4. *Cydista*.
5. *Batocydia*.
6. *Tabebuia*.
7. *Tecoma*.
8. *Enallagma*.
9. *Crescentia*.
10. *Schlegelia*.

1. **ARRABIDAEEA** DC. Bibl. Univ. Genev. 17: 126. 1838.

Woody vines, often high-climbing, with opposite petioled 2-foliate or 3-foliate leaves, the leaflets entire, the terminal one often represented by a tendril, and small, mostly purple flowers in terminal or axillary panicles. Calyx narrowly campanulate, 5-dentate or subtruncate. Corolla nearly salverform, the limb with 5 rounded lobes. Perfect stamens 4, nearly equal, included. Disk cup-like. Ovary sessile; ovules several or many; stigma 2-lobed; capsule linear; elongated, flattened. Seeds winged. [Commemorates Antonio de Arrabida, Brazilian botanist.] Perhaps 50 species of tropical America. Type species: *Arrabidaea Sego* DC.

1. **Arrabidaea Chica** (H. & B.) Verlot, Revue Hort. 40: 154. 1868.

Bignonia Chica H. & B. Pl. Aequin. 1: 107. 1808.

Adenocalymna portoricensis Stahl, Est. 6: 186. 1888.

Glabrous, or puberulent above, with slender terete elongated branches. Leaves slender-petioled; leaflets ovate, oval or oblong-lanceolate, chartaceous, entire, 4–8 cm. long, the apex acute, acuminate or obtuse, the base mostly obtuse or rounded, the slender petiolules about 15 mm. long or shorter; panicles several-many-flowered, mostly longer than the leaves; calyx densely puberulent, about 5 mm. long, its teeth very short; corolla about 15 mm. long, its limb nearly regular; capsule elongated, smooth.

Wooded limestone hills near Bayamon; Porto Rico, collected only by Stahl and by Sintenis:—Trinidad; continental tropical America.

2. **DISTICTIS** Mart.; Meisn. Pl. Vasc. Gen. 1: 300. 1840.

Woody vines, with opposite petioled 2- or 3-foliolate leaves, one of the leaflets often represented by a tendril, the large flowers in terminal panicles or racemes, the leaflets entire. Calyx broadly campanulate, subtruncate. Corolla tubular-funnelform, with a short cylindric base and a slightly 2-lipped, 5-lobed limb, the lobes rounded. Stamens 4, didynamous, inclined; anther-sacs divaricate. Disk large, thick. Ovary sessile; ovules many, in few rows. Capsule oblong, pointed, coriaceous, compressed. Seeds flat, hyaline-winged. [Greek, two rows.] Two known species, the following typical one, the other Cuban.

1. **Distictis lactiflora** (Vahl) DC. Prodr. 9: 191. 1845.

Bignonia lactiflora Vahl, Symb. 3: 80. 1794.

Bignonia odorata Bello, Anal. Soc. Esp. Hist. Nat. 10: 293. 1881.

Bignonia rigescens Jacq. Hort. Schoen. 2: 44. 1797.

Distictis rigescens DC. Prodr. 9: 191. 1845.

Macrodiscus lactiflorus Bureau; Baill. Hist. Pl. 10: 36. 1891.

Glabrous, or puberulent above, climbing, rather slender, about 6 m. long or shorter, the branches striate. Petioles 6–12 mm. long; leaflets 2, or 2 and a tendril, rarely 3, coriaceous, strongly reticulate-veined, ovate to oval or elliptic, 3–6 cm. long, the apex obtuse, rounded or acute, the base rounded or subcordate; panicles few-several-flowered; calyx puberulent, 4–5 mm. long; corolla white with a yellow throat within, puberulent or glabrate, about 4 cm. long, the limb about 3 cm. broad; capsule 7–10 cm. long, 2–3 cm. wide, narrowed at both ends.

Thickets and hillsides at low elevations, Porto Rico, most abundant in the southern districts: Vieques; St. Croix; St. Thomas:—Cuba; Hispaniola. PAGA PALO. VINDA. LIANA FRAGRANTE.

3. **AMPHILOPHIUM** H.B.K. Nov. Gen. 3: 148. 1819.

Climbing woody vines, with petioled opposite 2-foliolate or 3-foliolate leaves one of the leaflets often represented by a tendril, the rather large flowers in terminal panicles. Calyx-tube broadly campanulate, the limb widely expanded, undulate, with short erect interior lobes. Corolla-tube cylindric, straight, the limb 2-lipped. Stamens 4, didynamous, included. Anther-sacs divaricate. Disk annular, large. Capsule oblong, the valves coriaceous. Seeds in several rows, winged. [Greek, referring to the expanded crested calyx-limb.] About 6 species, natives of tropical America, the following typical.

1. **Amphilophium paniculatum** (L.) H.B.K. Nov. Gen. 3: 149. 1819.

Bignonia paniculata L. Sp. Pl. 623. 1753.

High-climbing, slender, minutely lepidote, the branches ridged. Leaves mostly 2-foliolate, occasionally with a tendril; petioles about 6 cm. long or shorter; leaflets ovate-orbicular, rather thin, entire, 7–13 cm. long, lepidote, the apex abruptly acuminate, the base cordate or subtruncate, the petioles 2–4 cm. long; panicles several-many-flowered, 1–2 dm. long; pedicels short; calyx-tube about 5 mm. long, the whitish limb 1.5–2 cm. broad; corolla purple, puberulent, about 3 cm. long, the limb much shorter than the tube.

Thickets at lower elevations in moist districts, Porto Rico:—Guadeloupe to St. Vincent; Mexico and northern South America. LIANA DE CUELLO.

4. **CYDISTA** Miers, Proc. Roy. Hort. Soc. **3**: 191. 1863.

Climbing woody vines, glabrous or very nearly so, the leaves with two entire leaflets and with or without a tendril representing a third leaflet, the large flowers few in terminal or axillary racemes, the bracts and bractlets small or minute. Calyx campanulate, truncate or minutely denticulate. Corolla funnel-form-campanulate, its large lobes rounded. Stamens 4, didynamous, included; staminodium small. Disk none. Ovary linear, sessile; ovules many; style filiform, elongated; stigma acute. Capsule elongated-linear, acute. Seeds coriaceous-winged. [Greek, wonderful.] An apparently monotypic genus.

1. **Cydista aequinoctialis** (L.) Miers, Proc. Roy. Hort. Soc. **3**: 191. 1863.

Bignonia aequinoctialis L. Sp. Pl. 623. 1753.

Bignonia spectabilis Vahl, Symb. **3**: 80. 1794.

A vine up to 8 m. long or longer, the branches quadrangular, rather slender. Leaflets ovate to ovate-elliptic, coriaceous, 7–15 cm. long, dark green, minutely lepidote when young, soon glabrous, acute or acuminate, the base rounded, the petiolules 1–2 cm. long; petioles 1–5 cm. long; racemes up to 2 dm. long or shorter; pedicels 8–25 mm. long; calyx about 8 mm. long; corolla white or purplish, 7–8 cm. long, the lobes about 2 cm. broad; capsule 2–3 dm. long, about 1 cm. wide, its valves tardily separating.

Thickets at lower elevations in moist or wet districts, Porto Rico; St. Croix; St. Thomas; St. Jan.—Cuba; Hispaniola; Guadeloupe to Trinidad; continental tropical America. BEJUCO BLANCO. LIANA DE LA SIERRA. GUARD WITHE.

5. **BATOCYDIA** Mart.; Britton, Mem. Brooklyn Bot. Gard. **1**: 90. 1918.

High-climbing woody vines, the leaves with 2 entire leaflets and a very slender deciduous 3-forked tendril, each fork bearing a small horny hook. Flowers large, bright yellow, solitary or few together in the axils. Calyx membranous, large, bright yellow, solitary or few together in the axils. Calyx membranous, large, bright yellow, solitary or few together in the axils. Corolla subcampanulate, reticulate-veined, its margin crenate-undulate, oblique. Funnel-form-campanulate, slightly curved, somewhat unequally 5-lobed. Stamens 4, didynamous, included. Staminodium linear, elongated. Disk annular. Ovary sessile; ovules many; style filiform; stigma rhombic-oblong, membranous. Capsule long-linear, dehiscent, the valves coriaceous. Seeds linear-oblong, winged. [Greek, glorious bramble.] An apparently monotypic genus.

1. **Batocydia Unguis** (L.) Mart.; Britton, loc. cit. 1918.

Bignonia Unguis L. Sp. Pl. 623. 1753.

Doxantha Unguis Miers, Proc. Roy. Hort. Soc. **3**: 190. 1863.

A vine, often 10–15 m. long, glabrous or very nearly so, the branches terete. Leaflets ovate to oblong, short-elliptic or obovate, membranous or chartaceous, 3–6 cm. long, acute or obtuse, the base narrowed or rounded, the petiolules short; petioles 1–3 cm. long; peduncles very slender, 1–3 cm. long; calyx greenish, 10–16 mm. long; corolla 5–8 cm. long, its lobes 1.5–2 cm. broad; capsules 3–4 dm. long, 12–14 mm. wide; seeds 2–3 cm. long, winged at the ends.

Climbing on trees at lower and middle elevations, Porto Rico, St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda.—Cuba; Hispaniola; St. Martin to Trinidad; continental tropical America. Occasionally planted for ornament. LIANA UÑADA. UÑA DE GATO. CAT-CLAW.

6. **TABEBUIA** Gomez, Obs. 2: 7. 1803.

Trees or shrubs, with opposite petioled, digitately 1-7-foliolate or simple leaves, the large showy flowers in terminal corymbs or panicles. Calyx tubular, toothed or cleft. Corolla funnelform, salverform or funnelform-campanulate, the limb spreading, slightly 2-lipped or nearly regular, the 5 lobes rounded. Stamens 4, didynamous, included; filaments slender, curved; anthers oblong or linear, glabrous. Ovary sessile; ovules many, in 2-several series. Capsule linear or linear-oblong, nearly terete, loculicidally dehiscent, its valves membranous or coriaceous, convex. Seeds numerous, winged. [Brazilian name.] Seventy-five species or more, natives of tropical America; those of Porto Rico known as **ROBLE**. Type species: *Bignonia Tabebuia* Vell.

Flowers red to red-purple.

Leaves simple.

Leaves ovate to elliptic.

Leaves obovate or oblanceolate.

Leaves 3-5-foliolate.

Flowers rose to white or pink; leaves 1-5-foliolate.

Leaflets oblong to elliptic, oblanceolate or obovate, dull or faintly shining.

Leaflets small, about 7 cm. long or shorter; capsule 5-11 cm. long.

Leaflets large, up to 15 cm. long; capsule 10-20 cm. long.

Leaflets narrowly oblong or oblanceolate, strongly shining, loosely reticulate-veined.

1. *T. rigida*.

2. *T. Schumanniana*.

3. *T. haemantha*.

4. *T. heterophylla*.

5. *T. pallida*.

6. *T. lucida*.

1. **Tabebuia rigida** Urban, Symb. Ant. 1: 404. 1899.

A tree, 8-20 m. high, or shrubby, the foliage minutely lepidote, the twigs flattened, somewhat 4-angled. Leaves simple, ovate to elliptic, subcoriaceous, 5-15 cm. long, the apex acute or obtuse, the base rounded or narrowed, the petioles 1-2.5 cm. long; inflorescence terminal at the forks of the twigs, nearly sessile or on a peduncle about 5 cm. long or shorter, 1-several-flowered; pedicels 2-3 cm. long; bractlets linear-subulate, 1.5-3 mm. long, calyx densely lepidote, 13-22 mm. long, its lobes short; corolla rose-red to red-purple, 3-4 cm. long, the limb 1.5-2 cm. broad, the lobes rounded; capsule about 15 cm. long.

Forests, at higher elevations in the eastern mountains of Porto Rico, ascending to the summits. Endemic. The wood is described as brown, hard and durable. **ROBLE DE SIERRA**.

2. **Tabebuia Schumanniana** Urban, Symb. Ant. 1: 404. 1899.

A tree, 5-15 m. high, the foliage minutely lepidote, the twigs somewhat angled. Leaves obovate or oblanceolate, coriaceous, 7-17 cm. long, the apex rounded, obtuse or acute, the base obtuse, narrowed or subcordate, the petioles about 2 cm. long or shorter; inflorescence terminal, 1-few-flowered; pedicels slender, 2-6 cm. long; bractlets linear-subulate; calyx densely lepidote, 9-17 mm. long, unequally short-lobed; corolla red, 3-4 cm. long, its limb 2-3 cm. broad, its lobes rounded; capsule 8-14 cm. long.

Forests of the western mountains of Porto Rico at middle and higher elevations. Endemic. **ROBLE COLORADO**.

3. **Tabebuia haemantha** (Bert.) DC. Prodr. 9: 214. 1845.

Bignonia haemantha Bert.; Spreng. Syst. 2: 832. 1825.

Tecoma haemantha Griseb. Cat. Pl. Cub. 194. 1866.

Spathodea portoricensis Bello, Anal. Soc. Esp. Hist. Nat. 10: 293. 1881.

A shrub or a small tree 5-8 m. high, recorded as sometimes up to 15 m. high, the foliage minutely lepidote, or elepidote, the twigs somewhat compressed.

Leaves 3-5-foliolate; petioles rather stout, 2-5 cm. long; leaflets elliptic, oblong-elliptic, ovate or slightly obovate, coriaceous, 4-15 cm. long, glabrous or minutely and sparingly lepidote, stalked or the lower ones sessile, the apex rounded or acutish, the base rounded, obtuse or subcordate; inflorescence several-many-flowered, sometimes 15 cm. broad; pedicels 3-20 mm. long; calyx 9-15 mm. long, its lobes short; corolla red or crimson, 3-5 cm. long, its limb 1.5-2 cm. broad; capsule 6-11 cm. long. [*Tecoma platyantha* of Stahl, not of Grisebach; *Bignonia quinquefolia* of Moçino and Sessé, not of Vellozo.]

Hillsides and woodlands at lower and middle elevations, western, central and southwestern districts of Porto Rico, most abundant in dry regions, extending east to Guayama. Endemic. ROBLE COLORADO.

4. ***Tabebuia heterophylla*** (DC.) Britton, Ann. Mo. Bot. Gard. 2: 48. 1915.

Raputia (?) *heterophylla* DC. Mem. Mus. Paris 9: 153. 1822.

Tabebuia triphylla DC. Prodr. 9: 214. 1845.

Tecoma Eggersii Kraenzlin, Repert. 17: 219. 1921.

A shrub, 2-4 m. high, or a small tree 5-10 m. high, the foliage densely lepidote. Leaves 1-5-foliolate; petioles about 3 cm. long or shorter; leaflets elliptic to oblong or obovate, stalked or the lower sessile, mostly 3-7 cm. long, finely reticulate-veined, subcoriaceous, dull or faintly shining, the apex obtuse, rounded or abruptly acute, the base narrowed or obtuse; inflorescence 1-20-flowered; pedicels slender; calyx 10-12 mm. long; corolla pink, white, or white with a pink limb, 4-7 cm. long; capsule 5-11 cm. long. [*Tecoma Berterii* of Grisebach and of Eggers, not of de Candolle.]

Woodlands and thickets, Porto Rico, mostly at lower elevations, in dry districts, often planted along roadsides; Mona; Culebra; Vieques; St. Thomas; St. Jan; Tortola; Virgin Gorda; Anegada;—Jamaica; Cayman Islands; St. Barts. Perhaps not specifically distinct from the following species, but this plant of dry districts has small leaflets, sometimes smaller flowers, and shorter pods. ROBLE PRIETO.

5. ***Tabebuia pallida*** Miers, Proc. Roy. Hort. Soc. 3: 199. 1863.

Bignonia Leucoxydon L. Sp. Pl. 624. 1753. Not *Tabebuia leucoxydon* DC.

Tecoma pentaphylla Juss. Gen. 139. 1789.

Tecoma Leucoxydon Mart.; DC. Prodr. 9: 219. 1845.

Tabebuia pentaphylla Hemsl. Bot. C. A. 2: 495. 1882. Not *Bignonia pentaphylla* L. 1763.

Tecoma Leucoxydon pentaphylla Bureau & Schum. in Mart. Fl. Bras. 8: 342. 1897.

Tabebuia pentaphylla Leucoxydon Kuntze, Rev. Gen. Pl. 480. 1891.

A tree, 5-20 m. high, the gray bark shallowly fissured, the foliage and inflorescence lepidote. Leaves 3-5-foliolate or some of them occasionally 1-foliolate; petioles about 10 cm. long or shorter. Leaflets elliptic to oblong or elliptic-obovate, 7-15 cm. long, faintly reticulate-veined, stalked, or the lower ones sessile, subcoriaceous, somewhat shining, acute or obtuse; inflorescence several-many-flowered; pedicels slender, about 2 cm. long or shorter; calyx about 10 mm. long; corolla pink, rose or white, 5-7 cm. long, capsule 1-2 dm. long, about 6 mm. thick.

Woodlands, hillsides and thickets, Porto Rico, at lower and middle elevations in wet or moist districts; much planted along roads and streets and elegant when in bloom; St. Croix; St. Thomas; St. Jan;—Bermuda (naturalized); Hispaniola; Saba to Tobago; Central America; Venezuela. The wood is white, strong and hard, with specific gravity of about 0.8; it is valued for construction, for furniture and for musical instruments. ROBLE BLANCO. WHITE CEDAR.

6. ***Tabebuia lucida*** Britton, Ann. Mo. Bot. Gard. 2: 48. 1915.

A tree up to 5 m. high. Leaves 3-5-foliolate; petioles slender, lepidote, 6 cm. long or less; petiolules of the larger, upper leaflets slender, lepidote, 8-20

mm. long, the lower leaflets sessile or nearly so; leaflets thin-coriaceous, narrowly oblong or oblong-oblancoate, 5–10 cm. long, 1–3 cm. wide, shining, loosely reticulate-veined, and lepidote on both sides, rather abruptly acute or obtusish at apex, narrowed or obtuse at the base; flowers clustered; pedicels lepidote; calyx about 14 mm. long, 2-lipped; corolla pink, glabrous, about 5 cm. long, its cylindric tube 5–6 mm. long, its narrowly campanulate throat about 3 cm. long, its limb about 1.5 cm. long, the lobes nearly entire.

Limestone cliffs, Mona. Endemic. ROBLE DE MONA.

Tabebuia glomerata Urban, POU, native of the southern West Indies, was seen at the Agricultural Experiment Station, Mayaguez, in 1924, as a fine tree about 10 m. high, in full bloom on February 24th, covered with its clustered bright yellow flowers about 6 cm. long and nearly bare of leaves; the 5-foliolate leaves are long-petioled, the leaflets obovate, 5–15 cm. long, the apex acuminate.

Tabebuia argentea (Bur. & Schum.) Britton [*Tecoma argentea* Bur. & Schum.], native of Paraguay, grown as young trees at the St. Croix and Mayaguez Agricultural Experiment Stations, planted in 1923, had attained a height of about 2 m. in 1925, with trunks about 5 cm. in diameter; it has 5–7-foliolate leaves, the long-stalked leaflets oblong, 6–15 cm. long, silvery-lepidote on both sides. The young tree at the St. Croix Station had its leaves persistent to the base of the trunk, the bark curiously sunken at the petiole-bases; it had already flowered, the corolla pink.

7. **TECOMA** Juss. Gen. 139. 1789.

Shrubs or trees, with opposite, pinnate or rarely simple leaves, and large flowers racemose or paniced at the ends of the branches. Calyx tubular-campanulate, 5-toothed. Corolla funnelform-campanulate, the limb slightly 2-lipped, 5-lobed, the lobes nearly equal. Stamens 4, didynamous. Ovary sessile or nearly sessile; ovules mostly in one series on the placentae. Capsule linear, loculicidally dehiscent, many-seeded, the seeds winged. [From the Aztec name Tecomaxochitl.] About 10 species, natives of tropical and warm-temperate America, the following typical.

1. **Tecoma stans** (L.) H.B.K. Nov. Gen. 3: 144. 1819.

Bignonia stans L. Sp. Pl. ed. 2, 871. 1763.

Stenolobium stans Seem. Journ. Bot. 1: 88. 1863.

Gelsemium stans Kuntze, Rev. Gen. Pl. 479. 1891.

A shrub, or small tree up to about 8 m. high, glabrous throughout. Leaves 1–3 dm. long, petioled; leaflets 5–13, lanceolate, oblong-lanceolate or elliptic, short-stalked, serrate, acute or acuminate at the apex, mostly narrowed at the base; racemes several-many-flowered; pedicels slender, 1 cm. long or less; calyx 3.5 mm. long, its teeth triangular-ovate, acute; corolla bright yellow, 3.5–5 cm. long, the cylindric part of its tube about twice as long as the calyx, its lobes broad; capsule 1–2 dm. long, 5–6 mm. in diameter, beaked.

Hillsides, southern dry districts, Porto Rico, much planted for ornament; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Florida; West Indies; continental tropical America. ROBLE AMARILLO. RUIBARBA. TRUMPET-FLOWER. YELLOW ELDER. YELLOW CEDAR. GINGER THOMAS.

8. **ENALLAGMA** [Miers]; Baill. Hist. Pl. 10: 24, 54. 1891.

Trees or shrubs, with simple alternate broad entire, short-petioled leaves, and terminal, few or solitary, long-peduncled flowers. Calyx closed in bud, cleft

at anthesis. Corolla-tube swollen, the limb oblique, not deeply lobed. Stamens 4, didynamous, included. Disk annular. Ovary sessile, 1-celled. Ovules many, on 2 parietal placentae. Fruit large, ellipsoid or subcylindric, indehiscent, woody or coriaceous, becoming 2-celled. Seeds many, compressed. [Greek, given in exchange.] A few species of tropical America, the following typical.

1. **Enallagma latifolia** (Mill.) Small, Fl. Miami 171, 200. 1913.

Crescentia latifolia Mill. Gard. Dict. ed. 8, no. 2. 1768.

Crescentia cucurbitina L. Mant. 2: 250. 1771.

Enallagma cucurbitina Baill. Hist. Pl. 10: 24. 1891.

Crescentia cucurbitina heterophylla Kuntze, Rev. Gen. Pl. 479. 1891.

A glabrous tree, 5–10 m. high, the bark smooth or shallowly fissured, the twigs gray. Leaves elliptic to obovate, chartaceous, 7–20 cm. long, the apex mostly abruptly acute, the base narrowed, the petioles only 4–10 mm. long, peduncles 2–3 cm. long; calyx about 3 cm. long, cleft nearly to the middle or below; corolla 4–5 cm. long, purplish or yellowish with the limb brown-margined; fruit subglobose, 6–8 cm. long, the skin smooth.

Woodlands, stream banks and hillsides at low elevations in moist districts, Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan:—Florida; Jamaica; Cuba; Hispaniola; Trinidad; Central America; Venezuela. HIGUERILLO. BLACK CALABASH.

9. **CRESCENTIA** L. Sp. Pl. 626. 1753.

Trees, with glabrous simple, usually fascicled leaves, and large, solitary or clustered, lateral or axillary flowers. Calyx leathery, closed in bud, 2-parted or 5-cleft at anthesis. Corolla with a subcampanulate swollen tube and an oblique lacerate or 5-lobed limb. Stamens 4, didynamous, included or a little exserted. Disk annular. Ovary 1-celled, sessile; ovules many, on 2 parietal placentae. Fruit globose or ovoid, large, indehiscent, 1-celled, the shell hard. Seeds numerous, wingless, compressed, borne on spongy placentae. [Commemorates Petrus de Crescentius, a celebrated Italian, born in 1230.] About 5 species, natives of tropical America, the first following typical.

Leaves spatulate, oblanceolate to obovate, obtuse or acute.

Leaves chartaceous, fruit subglobose or ellipsoid.

Leaves coriaceous, shining; fruit oblong-cylindric.

Leaves linear or linear-oblanceolate, acuminate, spinulose-tipped or mucronate.

1. *C. Cujete*.

2. *C. portoricensis*.

3. *C. linearifolia*.

1. **Crescentia Cujete** L. Sp. Pl. 626. 1753.

Crescentia fasciculata Miers, Trans. Linn. Soc. 26: 171. 1868.

A tree, attaining a maximum height of about 10 m., the trunk up to 2 dm. in diameter, with long spreading branches. Leaves spatulate to oblanceolate, fascicled, 5–15 cm. long, obtuse, acute or short-acuminate at the apex, narrowed to the nearly sessile base; flowers stout-peduncled; calyx 2–2.5 cm. long, its lobes broad, rounded or obtuse; corolla yellowish-purple, 5–6 cm. long, its lobes lacerate, much shorter than the tube; fruit subglobose to ellipsoid, 1–3 dm. in diameter, its rind hard.

Hillsides and plains at lower elevations, Porto Rico; Desecheo; St. Croix; St. Thomas; St. Jan; Tortola; much planted for its fruit, from which utensils are made:—Florida; West Indies; continental tropical America. The wood is light brown, tough and durable, with a specific gravity of about 0.8. HIGUERO. CALABASH.

2. **Crescentia portoricensis** Britton, Bull. Torr. Club 43: 457. 1916.

A vine-like glabrous shrub, with long slender branches, the bark light gray. Leaves obovate or elliptic-obovate, fascicled at the nodes or some of them alter-

nate, coriaceous, 5–15 cm. long, shining above, dull beneath, strongly reticulate-veined on both sides, the apex abruptly short-acuminate or obtuse, the base cuneate, the petioles 6–15 mm. long; flowers solitary; peduncle 1–2 cm. long, slender, in flower, thickened in fruit; calyx 2 cm. long, deeply 2-lobed; corolla subcampanulate, 4 cm. long, reticulate-veined, its broadly ovate entire lobes about one-fourth as long as the tube; fruit oblong-cylindric, 10 cm. long, 3.5 cm. in diameter, terete, pointed, the base truncate.

Forest along Rio de Maricao, Porto Rico. Endemic.

3. **Crescentia linearifolia** Miers, Trans. Linn. Soc. **26**: 172. 1868.

Crescentia microcarpa Bello, Anal. Soc. Esp. Hist. Nat. **10**: 294. 1881.

A tree, 5–7 m. high, or sometimes shrubby, glabrous throughout, the branches gray, leafy. Leaves densely fascicled at the nodes, linear to linear-oblongate, shining, rigid, 2–6 cm. long, or the lower much shorter, about 10 mm. wide or less, the apex sharply acuminate or mucronate, the base narrowed, the petioles very short; flowers solitary or few at the upper nodes; peduncles 5–10 mm. long; calyx broad, about 1 cm. long, deeply 2–3-cleft; corolla greenish, about 4 cm. long, its lobes lacerate; fruit globose or ellipsoid, 3–5 cm. long.

Woodlands and hillsides near the southwestern coast, extending east to near Salinas, and at Cabeza San Juan, Porto Rico; St. Thomas; St. Jan.—St. Martin. HIGUERITO.

10. **SCHLEGELIA** Miquel, Bot. Zeit. **2**: 785. 1844.

Shrubs or vines, often radicans, with simple entire opposite short-petioled leaves, the mostly small flowers fascicled or solitary in the axils, or in terminal panicles. Calyx tubular-campanulate, truncate. Corolla nearly salverform or narrowly campanulate, its lobes short. Stamens 4, didynamous, included; staminodium subulate. Disk none or obsolete. Ovary 2-celled; ovules several or many, erect; style slender. Fruit globose, hard, indehiscent. Seeds oblong. [Commemorates H. Schlegel, Dutch zoologist.] About 6 species, natives of tropical America. Type species: *Schlegelia lilacina* Miquel.

1. **Schlegelia portoricensis** (Urban) Britton.

Schlegelia brachyantha portoricensis Urban, Symb. Ant. **1**: 406. 1899.

A vine or vine-like shrub, up to 6 m. long or longer, the twigs glabrous, terete. Leaves elliptic or elliptic-obovate, coriaceous, glabrous, 4–11 cm. long, short-petioled, the apex and base rounded or obtuse, or the base sometimes narrowed; flowers axillary or lateral, fascicled or solitary; pedicels pubescent when young, 2-bracteolate, 3–8 mm. long, glabrous when old; calyx about 5 mm. long, narrowed below; corolla white or pink, with purplish-veined throat, 15–18 mm. long, the rounded lobes about one-fourth as long as the tube; fruit almost 1 cm. in diameter. [*S. axillaris* of Stahl, not of Grisebach.]

Forests and river-banks, Porto Rico, in wet or moist districts, ascending to the higher elevations. Endemic. HIGUERITO DE SIERRA. TULIPA.

Bignonia (?) **caryophyllea** Bello, Anal. Soc. Esp. Hist. Nat. **10**: 293. 1881.

This is a very interesting vine, BEJUCO DE CLAVO, of which neither the flowers nor the fruit are known. It has petioled 2-foliolate leaves; the leaflets (one of them sometimes represented by a slender tendril) are ovate, membranous, serrate, 5–9 cm. long, the apex long-acuminate, the base rounded, the petiolules 10–15 mm. long. Its roots are described as thick, aromatic, and were used to give color and good flavor to rum. Foliage was collected at Añasco, Porto Rico, many years ago, and the plant has also been found in Cuba.

Tecomaria capensis (Thumb.) Spach, CAPE TRUMPET-FLOWER, South African, planted for ornament in Porto Rico and the Virgin Islands, is a shrub, sometimes half-climbing, 1–3 m. long, with pinnately compound leaves 10–15 cm. long, the 5–9 acute, serrate leaflets 5 cm. long or less, the orange-red flowers in terminal panicles, the corolla 5 cm. long with a curved tube and a short spreading limb: the flattened linear capsule is about 5 cm. long. [*Bignonia capensis* Thunb.; *Tecoma capensis* Lindl.; ? *Tecoma radicans* of Krebs.]

Spathodea campanulata Beauv., AFRICAN TULIP-TREE, SPATHODEA, of tropical Africa, a tree, up to 15 m. high or higher, with pinnate leaves of 7–17 ovate acute leaflets 7–10 cm. long, and terminal clusters of large showy scarlet irregular flowers, the corolla 7–10 cm. long, is occasionally planted in Porto Rico and the Virgin Islands for ornament and shade, very conspicuous when in bloom in the late winter.

Spathodea nilotica Seem., also of tropical Africa, was seen as luxuriant seedlings, grown under this name at the Forest Station, Rio Piedras in 1925.

Macrocalatpa longissima (Jacq.) Britton, of Jamaica and Hispaniola, is recorded by Grisebach from St. Thomas, presumably erroneously; there is a Parish of St. Thomas in Jamaica.

Urban records an undetermined vine of this family collected by Sintenis without flowers along the Rio Plata at Cidra near Cayey, with 2-foliolate leaves, the leaflets obovate, 3–4 cm. long, rounded or subtruncate.

Jacaranda acutifolia H. & B., South American, grown by the Agricultural Experiment Stations of Porto Rico and St. Croix, forms a large tree, with bipinnate leaves, the ultimate leaflets oblong-lanceolate, 6–12 mm. long, acute, the violet or blue flowers in large panicles, the corolla 3.5–5 cm. long, the nearly orbicular capsule about 6 cm. long. [*J. ovalifolia* R. Br.; *J. mimosaeifolia* D. Don.]

Pyrostegia ignea (Vahl) Presl, Brazilian, introduced in 1924 at the Insular Experiment Station, Rio Piedras, is a climbing woody vine, the leaves of 2 ovate leaflets and a tendril, or sometimes of 3 leaflets, the showy orange-red flowers in axillary corymbs, the tubular corolla 6–7 cm. long, with a short 2-lobed limb. It was flowering profusely in February 1925. [*Bignonia ignea* Vell.; *B. venusta* Ker; *Pyrostegia venusta* Baill.]

Pandorea Ricasoliana (Tanfani) Baill., South African, successfully established in 1924 at the Insular Experiment Station, Rio Piedras, and at the Trujillo Plant Propagation Station, is a long slender woody vine, with odd-pinnate leaves, the serrate leaflets 9–11, the showy pink flowers about 6 cm. long, in terminal panicles.

Phryganocydia corymbosa (Vent.) Bureau, of Trinidad and continental tropical America, a long woody vine, with leaves of two elliptic leaflets and often a tendril, the large flowers corymbose, the calyx spathaceous, the nearly salverform corolla with a white tube 5–6 cm. long and a spreading lilac limb 4–5 cm. broad, is occasionally grown for ornament in St. Thomas. [*Spathodea corymbosa* Vent.]

Adenocalymna alliaceum (Lam.) Miers, a woody vine, native of Guiana, with short-petioled, 2-foliolate leaves, the oblong or elliptic leaflets 6–16 cm. long, the racemose flowers 5–6 cm. long, the calyx minutely 5-denticulate, the

corolla funnellform, appeared to be well established at the Trujillo Plant Propagation Station in 1925 [*Bignonia alliacea* Lam.].

Parmentiera cerifera Seem., PALO DE VELA, CANDLE-TREE, of Panama, planted at the Mayaguez Agricultural Experiment Station, was also seen as seedlings in the collection at Louisenhøj, St. Thomas in 1925. It forms a small tree, 5-6 m. high, its leaves 3-foliolate, its flowers borne on the old wood of stems and branches, its cylindric white fruit elongated.

Kigelia pinnata DC., SAUSAGE-TREE, of tropical Africa, grown at the Agricultural Experiment Station, Mayaguez, has pinnate leaves, long-peduncled, paniced, reddish flowers 7-8 cm. long, the long-pendulous fruit cylindric, indehiscent, 3-5 dm. in length. The tree attains a height of 10 m. or more.

Bignonia radicans L., TRUMPET-CREEPER, North American, grown on arbors at the hotel garden, Condado, seen there in fruit in March, 1925, is a long woody vine, with pinnate leaves of 7-11 ovate, serrate leaflets 3-7 cm. long, corymbose orange-red flowers about 6 cm. long, the fruit a nearly terete capsule 10-15 cm. long, narrowed at both ends, the flat seeds broadly winged. [*Tecoma radicans* DC.]

Paulownia tomentosa (Thunb.) Baill., EMPRESS TREE, Chinese, planted at the Mayaguez Experiment Station in 1921, had reached a height of 4 m. in April 1925 and appeared vigorous. It forms a large spreading tree with large ovate long-petioled leaves, the conspicuous violet flowers about 6 cm. long, unfolding before the leaves, the coriaceous capsules ovoid, about 5 cm. long. [*Bignonia tomentosa* Thunb.; *P. imperialis* Sieb. & Zucc.]

Paulownia Fortunei (Seem.) Hemsl., also Chinese, seen at the Forest Station, Rio Piedras, Porto Rico, grown from seedlings received under this name from the Bureau of Plant Industry, Washington, in September 1924, had reached a height of 1.5 m. in March 1925 and was growing vigorously, closely resembling the preceding species. [*Campsis Fortunei* Seem.]

Family 12. PEDALIACEAE Lindl.

PEDALIUM FAMILY.

Mostly herbs, often mucilaginous, the leaves opposite or the upper alternate, and axillary, solitary or sometimes fascicled, perfect irregular flowers. Calyx 5-cleft or 5-parted. Corolla with a subcylindric tube and a usually short, obscurely 2-lipped, 5-lobed limb. Stamens mostly 4 and didynamous, included; anthers dorsifixed, the sacs parallel, or in some genera distinct. Disk fleshy. Ovary sessile, 2-4-celled; ovules several or many, anatropous; style filiform. Fruit various. Seeds without endosperm. About 14 genera, including some 45 species, natives of the Old World.

1. **SESAMUM** L. Sp. Pl. 634. 1753.

Herbs, usually erect, the lower leaves opposite, the upper alternate, or all sometimes alternate, the violet to white, short-peduncled flowers solitary in the axils. Calyx 5-parted. Tube of the corolla oblique at the base, somewhat gibbous, the limb 5-lobed, slightly 2-lipped, the lobes spreading. Stamens 4, didynamous, borne near the base of the corolla; anthers sagittate. Ovary 2-celled; ovules many in each cavity, superimposed in a single series. Fruit an oblong, 4-sided loculicidal capsule. [Arabic name.] About 12 species, natives of tropical Africa and Asia, the following typical.

1. **Sesamum orientale** L. Sp. Pl. 634. 1753.*Sesamum indicum* L. Sp. Pl. 634. 1753.

Erect, simple or branched, more or less pubescent, 0.7–2 m. high. Leaves lanceolate or ovate-lanceolate, 7–15 cm. long, acuminate at the apex, mostly narrowed at the base, papillate beneath, the petioles 1–5 cm. long; peduncles about 4 mm. long; sepals linear-lanceolate, about 1 cm. long; corolla pale rose, 2–3 cm. long; capsule linear-oblong, short-beaked, 4-grooved, 2–3 cm. long.

Occasionally spontaneous in Porto Rico after cultivation for its seeds; Mona; Vieques; St. Thomas:—cultivated nearly throughout the West Indies. Native of the East Indies. AJONJOLI. BENNY-SEED. SESAME.

Family 13. **MARTYNIACEAE** Link.

UNICORN-PLANT FAMILY.

Herbs, with opposite leaves, or the upper alternate, and perfect irregular flowers. Calyx inferior, 4–5-cleft or 4–5-parted, or sometimes split to the base on the lower side. Corolla gamopetalous, irregular, the tube oblique, the limb slightly 2-lipped, 5-lobed, the lobes nearly equal, the 2 upper ones exterior in the bud. Anther-bearing stamens 4, didynamous, or 2, or the posterior pair sterile; anthers 2-celled, the sacs longitudinally dehiscent. Ovary 1-celled, with 2 parietal placentae expanded into broad surfaces, or 2–4-celled by the intrusion of the placentae or by false partitions; ovules anatropous; style slender; stigma 2-lobed or 2-lamellate. Seeds compressed; endosperm none; embryo large; cotyledons fleshy, flat; radicle short, straight. Three genera and about 12 species, mainly tropical.

Corolla funnelform-campanulate.
Corolla nearly salverform, the cylindric tube elongated.

1. *Martynia*.
2. *Craniolaria*.

1. **MARTYNIA** L. Sp. Pl. 618. 1753.

Coarse glandular-pubescent and viscid strong-scented herbs, with long-petioled leaves, and large flowers in short terminal racemes. Calyx 1–2-bracteolate at the base, campanulate, inflated, deciduous. Corolla funnelform-campanulate. Anthers gland-tipped, their sacs divergent. Ovary 1-celled, the 2 parietal placentae intruded and expanded in the center of the cavity into broad surfaces bearing the ovules in 1 or 2 rows. Fruit an incurved beaked loculicidally 2-valved capsule, the exocarp somewhat fleshy, the endocarp fibrous, woody, crested below or also above, 4-celled by the extension of the placentae. Seeds numerous, tuberculate. [Named for John Martyn, 1693–1768, Professor of Botany at Cambridge, England.] About 8 species, natives of America. Type species: *Martynia annua* L.

1. **Martynia annua** L. Sp. Pl. 618. 1753.*Martynia diandra* Glöx. Obs. Bot. 14. 1785.

Viscid-pubescent, branched, 5–8 dm. high, the stem and branches rather stout. Leaves thin, flaccid, opposite, long-petioled, ovate-orbicular, 8–15 cm. long, sinuate-dentate, palmately veined, acute at the apex, cordate at the base; racemes short-peduncled, several-flowered; pedicels 1–2 cm. long, slender, thickening and recurved in fruit; calyx very deeply 5-cleft, about 1.5 cm. long, its segments acute; stamens 2; corolla pink, or nearly white, 3–5 cm. long, its

rounded lobes purple-blotched; capsule obliquely ovoid, compressed, 2–2.5 cm. long, viscid, tipped with a hooked beak about 3 mm. long.

River-banks, waste and cultivated grounds, Porto Rico; St. Croix; St. Thomas; Tortola.—Bahamas; Cuba; Hispaniola; Antigua; Martinique; St. Vincent; continental tropical America. ESCORZONERA. UÑA DE GATO.

Martynia louisiana Mill., UNICORN PLANT, North American, was experimentally grown at the Trujillo Plant Propagation Station in 1924; it is a coarse annual glandular-pubescent herb, with large ovate-orbicular leaves, the yellowish, purple-mottled flowers 3.5–5 cm. long, the curved fruit long-beaked, 10–15 cm. long.

2. **CRANIOULARIA** L. Sp. Pl. 618. 1753.

Viscid-villous annual herbs with broad, long-petioled cordate lobed leaves and large elongated white flowers in short terminal racemes. Calyx membranous, oblong, deeply cleft. Corolla nearly funnelform, the long slender curved cylindric tube expanded above the somewhat 2-lipped limb, 5-lobed, the lobes rounded, spreading. Perfect stamens 4; anther-sacs divaricate. Ovary 1-celled, with 2 intruded parietal placentae. Fruit short, compressed, the beak incurved, the exocarp fleshy. Seeds many, oblong. [Greek, skull-like.] Two known species, the following typical one, the other South American.

1. **Craniolaria annua** L. Sp. Pl. 618. 1753.

Usually branched, rather stout, 5–8 dm. high. Petioles 6–14 cm. long; leaf-blades suborbicular in outline, 7–12 cm. broad, deeply cordate, palmately veined and 3–5-lobed, the lobes broad, acute or obtuse, remotely dentate; racemes few-flowered, short-peduncled; pedicels 1–2 cm. long; calyx about 4 cm. long; corolla-tube 10–15 cm. long, about 3 mm. thick, the expanded throat 2–3 cm. long, the limb 3–5 cm. wide; fruit 2–3 cm. long, the incurved beak about 5 mm. long.

Sandy soil, northern coastal plane of Porto Rico:—Hispaniola; Trinidad; Margarita; South America. ESCORZONERA.

Family 14. **GESNERIACEAE** Nees.

GESNERIA FAMILY.

Herbs or shrubs, with alternate or opposite leaves and terminal or axillary, solitary or clustered, perfect, irregular flowers. Calyx mostly gamosepalous, free from the ovary or partly adnate to it. Corolla gamopetalous, mostly 2-lipped. Stamens 4 or 2, borne on the tube or the base of the corolla; anthers 2-celled; staminodia 1–3. Ovary 1-celled; placentae 2, parietal; ovules usually numerous, minute, anatropous; style simple, usually elongated. Fruit capsular. Seeds very small; embryo straight. A large family of about 100 genera and perhaps 800 species, mostly tropical.

Ovary superior.

Anthers distinct.

Anthers coherent.

Ovary inferior, at least in part.

Stamens borne at the base of the corolla.

Stamens not exserted, or scarcely exserted.

Calyx not verrucose.

Calyx verrucose.

Stamens long-exserted; shrubs or small trees.

Stamens borne on the corolla above the base.

1. *Crantzia*.

2. *Columnnea*.

3. *Gesneria*.

4. *Duchartrea*.

5. *Pentstemon*.

6. *Rhytidophyllum*.

1. **CRANTZIA** Scop. Intr. 173. 1777.[*ALLOPLECTUS* Mart. Nov. Gen. 3: 53. 1829.]

Shrubs, often epiphytic, with opposite leaves and axillary, clustered or solitary flowers. Calyx 5-parted, free from the ovary, the segments dentate, entire or crested. Corolla with a straight or curved tube and an oblique 5-lobed limb. Stamens borne at the base of the corolla; anthers distinct; staminodium free. Ovary superior; style long. Stigma dilated or 2-lobed. Fruit baccate. [Commemorates H. J. N. von Crantz, 1722–1799, Austrian botanist.] Thirty species or more, natives of tropical America. Type species: *Besleria cristata* L.

1. **Crantzia ambigua** (Urban) Britton.*Alloplectus ambiguus* Urban, Symb. Ant. 1: 408. 1899.*Alloplectus ambiguus chlorosepalus* Urban, loc. cit. 1899.

Stems commonly clustered, and rooting at the lower nodes, 3–5 dm. long, quadrangular, villous, becoming glabrate. Leaves ovate, more or less unequal, one larger and one smaller at each node of the stem, 4–10 cm. long, crenate or entire, slightly fleshy, sparingly pubescent on both sides, acute or obtuse, the oblique base narrowed, obtuse or subcordate, the petioles 5–15 mm. long; flowers 2–6 together in the axils, on slender pilose pedicels 5–15 mm. long; bracts 3–8 mm. long; calyx-segments ovate-oblong, acuminate, green or red, 8–12 mm. long; corolla yellow, about 2 cm. long; berry snow-white, globose or ovoid, about 7 mm. in diameter. [*A. cristatus* of Stahl, not of Martius; *Columnnea cristata* of Kuntze.]

On trees, in forests and on wooded hills, in wet or moist districts of Porto Rico, ascending to higher elevations. Endemic.

2. **COLUMNNEA** L. Sp. Pl. 638. 1753.

Shrubs, often epiphytic and radicans, with opposite leaves, the red or yellow flowers axillary. Calyx 5-cleft or 5-parted, free from the ovary. Corolla with a straight or somewhat curved tube and a 2-lipped limb. Stamens borne at the base of the corolla, the anthers coherent, the staminodium free. Ovary superior, style slender; stigma entire or 2-cleft. Fruit baccate. [Commemorates Fabio Colonna, 1567–1640, eminent Italian.] About 75 species, natives of tropical America. Type species: *Columnnea scandens* L.

1. **Columnnea Tulae** Urban, Symb. Ant. 1: 409. 1899.*C. Tulae rubra* Urban, loc. cit. 1899.*C. Tulae flava* Urban, loc. cit. 410. 1899.

Stems 2–6 dm. long, rooting on trees, 4-sided, hirsute, becoming glabrate. Leaves oblong to elliptic, 2–5 cm. long, short-pubescent on both sides, entire or obscurely crenate, short-petioled, obtuse or acute, the base narrowed; flowers solitary in the axils; peduncles 9–15 mm. long; calyx-segments distinct nearly to the base, lanceolate, acuminate, pubescent, 10–12 mm. long; corolla red, scarlet or yellow, 4–5 cm. long, short-pilose, the unequally lobed limb much shorter than the tube; berry globose, white, about 10 mm. in diameter. [*C. hispida* of Cook and Collins; included by de Candolle, by Grisebach and by Kuntze in *C. scandens* L.

On trees in mountain forests, Porto Rico. Endemic. TIBEY PARASITICO.

3. **GESNERIA** [Plum.] L. Sp. Pl. 612. 1753.

Herbs or low shrubs with membranous or chartaceous leaves, the rather small flowers few or solitary on axillary peduncles. Calyx-tube ribbed or terete,

adnate to the ovary, its lobes ovate to linear. Corolla nearly tubular with a 5-lobed, slightly 2-lipped limb. Stamens borne at or near the base of the corolla-tube, included or scarcely exerted. Disk annular; style slender. Capsule about as long as the calyx-tube. [Commemorates Conrad Gesner, 1516–1565, distinguished Swiss physician.] About 20 species, natives of tropical America. Type species: *Gesneria humilis* L.

Leaves chartaceous; corolla yellow.

Leaves membranous.

Peduncles little if at all longer than the leaves, 1-flowered, usually curved; corolla red.

Peduncles much longer than the leaves, 1–6-flowered, scarcely curved; corolla yellow.

1. *G. citrina*.

2. *G. cuneifolia*.

3. *G. pauciflora*.

1. ***Gesneria citrina*** Urban, Symb. Ant. 1: 477. 1900.

Stems rather stout, woody, often curved, pendent or ascending, 2–8 dm. long. Leaves obovate to spatulate, chartaceous, alternate, pale green, glabrous, or sparingly pilose above, 3–6 cm. long, coarsely crenate-dentate above the middle the apex obtuse, the base cuneate, the petioles 4–12 mm. long; peduncles 2.5–7 cm. long, very slender, curved, 1-flowered, glabrous or sparingly pilose; calyx-tube turbinate, 10-ribbed, about 3 mm. long, the linear-lanceolate, acuminate lobes about as long; corolla tubular, narrowed below, yellow, puberulent, about 2 cm. long, the short rounded lobes nearly erect; filaments glabrous; capsule globose, 4–5 mm. in diameter.

Limestone rocks, northern and northwestern districts of Porto Rico. Endemic.

2. ***Gesneria cuneifolia*** (DC.) Sessé & Moc. Fl. Mex. ed. 2: 144. 1894.

Conradia cuneifolia DC. Prodr. 7: 526. 1838.

Pentarrhaphia cuneifolia Hanst. Linnaea 34: 294. 1865.

Conradia reticulata Griseb. Cat. Pl. Cub. 201. 1866.

Gesneria portoricensis Bello, Anales Soc. Esp. Hist. Nat. 10: 288. Hyponym. 1881.

Gesneria reticulata Urban, Symb. Ant. 2: 378. 1901.

Stems short, somewhat woody, 2–15 cm. long. Leaves rosulate, membranous, oblanceolate to obovate, 4–14 cm. long, irregularly dentate, glabrous, reticulate-veined, sessile or very short-petioled, the apex rounded or acute, the base cuneate; peduncles 1-flowered, often curved, shorter than the leaves; calyx-tube obconic, ribbed, 4–5 mm. long, the triangular-lanceolate or triangular-ovate lobes about as long; corolla tubular, red, puberulent, about 2 cm. long, its short lobes rounded, erose; capsule about as long as the calyx-tube.

Rocky woodlands and thickets in moist or wet districts of Porto Rico, ascending to the higher elevations:—Cuba; Hispaniola. Originally erroneously recorded as from Mexico. YERBA DE CUEVA. YERBA PARRERA.

3. ***Gesneria pauciflora*** Urban, Symb. Ant. 1: 478. 1900.

Stems slender, slightly woody, 5–20 cm. long, sometimes rooting at lower nodes, loosely pubescent when young. Leaves oblong to oblanceolate, membranous, 3–9 cm. long, appressed-pubescent when young, glabrous when old, pale beneath, irregularly and rather sharply dentate, the apex acute or obtuse, the base narrowed or cuneate, the petioles 3–8 mm. long; peduncles very slender, longer than the leaves, 1–6-flowered, straight or slightly curved; pedicels 1–3 cm. long; calyx-tube turbinate, pubescent, ribbed, 3–4 mm. long, its lobes linear-lanceolate, obtuse, about 4 mm. long; corolla light yellow, tubular, puberulent, about 2 cm. long, its short erect lobes rounded; capsule turbinate, about 5 mm. long.

Rocky banks and rivulets, near Maricao, Porto Rico. Endemic.

4. **DUCHARTREA** Dcne. Ann. Sci. Nat. III. 6: 109. 1846.

Resiniferous shrubs, with coriaceous dentate leaves and rather large flowers in long-peduncled corymbs. Calyx densely verrucose, its tube adnate to the ovary, its limb with 5 linear teeth. Corolla subcampanulate, the somewhat 2-lobed limb oblique, 5-lobed. Stamens borne near the base of the corolla, not exserted; staminodia villous; anthers coherent in pairs. Style filiform; stigma 2-lobed; ovules many. Capsule woody, about as long as the calyx-tube. [Commemorates Pierre E. Duchartre, French botanist.] Four or five species, natives of Cuba and Porto Rico. Type species: *Duchartrea viridiflora* Dcne.

1. **Duchartrea Sintenisii** (Urban) Britton.

Gesneria Sintenisii Urban, Symb. Ant. 2: 375. 1901.

A shrub, 2–5 m. high, the twigs stout, granular, glabrous. Leaves obovate to elliptic, 1–2 dm. long, the apex obtuse, acute or short-acuminate, the base obtuse, pale beneath, the venation widely spreading, the stout petioles 1–2.5 cm. long, the margins minutely crenulate or entire; peduncles axillary, as long as the leaves or shorter, few-several-flowered; calyx granular in flower, densely verrucose in fruit, the turbinate tube 5–6 mm. long, the linear-lanceolate lobes 6–14 mm. long; corolla yellowish green, 15–17 mm. long, the limb about 15 mm. broad, the lobes rounded; capsule a little longer than the calyx-tube.

Forests and summits of the eastern mountains of Porto Rico. Endemic.

5. **PENTARHAPHIA** Lindl. Bot. Reg. 13: under *pl. 1110* 1827.

Shrubs or small trees, with coriaceous or chartaceous leaves, and large flowers mostly in long-peduncled small clusters or solitary. Calyx smooth, ribbed or subterete, its tube adnate to the ovary, its 5 teeth usually narrow. Corolla subcampanulate or narrower, its tube often somewhat curved, expanded above, the limb oblique, 2-lipped, 5-lobed; stamens borne at the base of the corolla, exserted; filaments filiform; anthers coherent. Disk annular. Style elongated. Capsule about as long as the calyx-tube. [Greek, referring to the 5-ribbed calyx-tube.] Perhaps 30 species, natives of tropical America. Type species: *Gesneria ventricosa* Sw.

1. **Pentarhaphia albiflora** Dcne. Ann. Sci. Nat. III. 6: 101. 1846.

Gesneria albiflora Kuntze, Rev. Gen. Pl. 473. 1891.

A shrub, 2–3 m. high, or a small tree, 4–5 m. high, the glabrous branches and twigs slender. Leaves oblong to elliptic or elliptic-obovate, glabrous, denticulate or entire, chartaceous or subcoriaceous, 4–10 cm. long, the primary venation ascending, the apex acute or acuminate, the base narrowed, the petioles 7–15 mm. long; peduncles very slender, longer than the leaves, 2–4-flowered; calyx-tube obconic in flower, campanulate in fruit, ribbed, 7–10 mm. long, its linear lobes about as long; corolla about 2 cm. long, remarkably various in color, white, yellow, brownish or mottled, or the limb purplish; capsule a little longer than the calyx-tube, its free tip pubescent. [*Conradia pedunculosa* of Bello and of Stahl, not of de Candolle; *Tupa acuminate* of Stahl, not of de Candolle.]

Thickets, woodlands, hillsides, river-banks and arroyos at lower and middle elevations in moist and dry districts of Porto Rico. Endemic.

6. **RHYTIDOPHYLLUM** Mart. Nov. Gen. 3: 38. 1829.

Shrubs or small trees, with alternate, usually elongated, short-petioled leaves, and rather large flowers in long-peduncled axillary cymose panicles.

Calyx-tube hemispheric or turbinate, not ribbed, adnate to the ovary, its lobes short. Corolla curved, narrowly campanulate, its limb oblique, 5-lobed. Stamens borne on the corolla above its base, included or scarcely exerted; anthers coherent, their sacs parallel. Disk annular; style slender. Capsule 2-valved above. [Greek, wrinkled leaf.] About 10 species, natives of the West Indies. Type species: *Gesneria tomentosa* L.

1. **Rhytidophyllum auriculatum** Hook. Bot. Mag. **64**: pl. 3562. 1837.

Rhytidophyllum stipulare Urban; Stahl, Est. **6**: 260. 1888.

R. auriculatum stipulare Urban, Symb. Ant. **2**: 384. 1901.

A sparingly branched shrub, 1–2 m. high, the rather stout branches densely glandular-tomentulose. Leaves obliquely oblong-ob lanceolate, inequilateral, membranous, viscid-pubescent, large, 1–2.5 dm. long, crenulate, the apex acuminate or acute, the base narrowed, subcordate, the petioles stout, 1–3 cm. long, often with suborbicular stipule-like basal appendages; peduncles about as long as the leaves or longer, several-many-flowered; pedicels 0.5–3 cm. long; calyx-tube about 5 mm. long, tomentulose, its oblong, ovate or lanceolate lobes 2–3 mm. long; corolla yellow to reddish, brown within, densely appressed-pubescent, about 1.5 cm. long.

Wet rocky situations, western and northwestern districts of Porto Rico:—Hispaniola. TIBEY AMARILLO.

Achimenes longiflora DC., recorded as collected by Krug near Cabo Rojo, presumably cultivated, is a pubescent, Central American herbaceous plant, 3–6 dm. high, with tuberiferous slender rootstocks, the opposite or verticillate leaves oval or ovate, serrate, the flowers solitary in the axils, the salverform corolla with a spreading violet limb. It is occasionally grown for ornament in Porto Rico.

Sinningia speciosa (Lodd.) Benth. & Hook., GARDEN GLOXINIA, Brazilian, occasionally grown in Porto Rico flower gardens, is low, herbaceous, with large opposite long-petioled broad villous leaves, the large and showy usually purplish flowers with a campanulate 5-lobed corolla [*Gloxinia speciosa* Lodd.].

Saintpaulia ionantha Wendl., AFRICAN VIOLET, of tropical Africa, was experimentally grown at the Trujillo Plant Propagation Station, Porto Rico, in 1925, introduced in 1924.

Family 15. **ACANTHACEAE** J. St. Hil.

ACANTHUS FAMILY.

Herbs, or some tropical genera shrubs or small trees, with opposite simple estipulate leaves, and irregular, or nearly regular, perfect flowers. Calyx inferior, persistent, 4–5-parted or 4–5-cleft, the sepals or segments imbricated. Corolla gamopetalous, nearly regularly 5-lobed, or 2-lipped. Anther bearing stamens 4, didynamous, or 2 only; anther-sacs longitudinally dehiscent. Disk annular, or cup-like. Ovary 2-celled; ovules 2–10 in each cavity, anatropous or amphitropous; style filiform, simple; stigmas 1 or 2. Capsule dry, 2-celled, loculicidally elastically 2-valved. Seeds not winged, borne on projections (retinacula) from the placentae, the testa close, mostly roughened, often developing spiral threads and mucilage when wetted. About 175 genera and 2,000 species, natives of temperate and tropical regions.

- A. Retinacula papilliform.
Stamens 2; flowers small, densely spicate; seeds several or many;
herb. Perfect stamens 4; flowers large, axillary or in terminal racemes;
seeds 4; vines. 1. *Nelsonia*.
2. *Thunbergia*.
- B. Retinacula curved or hooked.
a. Corolla-lobes contorted.
Corolla 2-lipped. 3. *Hygrophila*.
Corolla not 2-lipped. 4. *Blechum*.
Flowers in bracted spikes. 5. *Ruellia*.
Flowers solitary or panicled.
b. Corolla-lobes imbricated, not contorted.
*Plants armed with axillary spines in our species. 6. *Barleria*.
Stamens 4; corolla-lobes spreading. 7. *Anthacanthus*.
Stamens 2; corolla 2-lipped.
**Plants unarmed.
†Perfect stamens 4. 8. *Lepidagathis*.
Corolla 2-lipped. 9. *Gerardia*.
Corolla not 2-lipped.
††Perfect stamens 2. 10. *Odontonema*.
Staminodia 2. 11. *Diapedium*.
Staminodia none. 12. *Drejerella*.
Flowers involucrate.
Flowers exinvolucrate; spicate or paniculate.
Bracts of the spikes imbricated.
Bracts of the spikes not imbricated. 13. *Justicia*.
Flowers large, densely spicate or solitary;
shrubs. 14. *Stethoma*.
Flowers small, filiform-spicate or paniculate;
herbs.

1. NELSONIA R. Br. Prodr. 480. 1810.

A diffuse, softly villous herb, with opposite entire leaves and small blue to purple flowers in terminal and axillary bracted spikes. Calyx 4-lobed, the upper lobe 2-toothed or 2-cleft. Corolla with a slender tube and a 2-lipped limb, the upper lip 2-cleft, the lower 3-lobed. Stamens 2; filaments short; anther-sacs mucronulate at base. Ovules several in each ovary-cavity; stigma 2-lobed. Capsule oblong, beaked. [Named for David Nelson, an English gardener.] A monotypic genus.

1. *Nelsonia brunellioides* (Lam.) Kuntze, Rev. Gen. Pl. 493. 1891.

Justicia brunellioides Lam. Tabl. Encycl. 1: 40. 1791.

Justicia nummularifolia Vahl, Enum. 1: 122. 1804.

Nelsonia nummularifolia R. & S. Syst. 1: 173. 1817.

Stems slender, prostrate, branched 1.5–6 dm. long. Leaves ovate, 1.5–7 cm. long, obtuse or acutish, the base rounded or short-decurrent on the petiole, the petioles 2–20 mm. long; spikes dense, peduncled or sessile, 2–6 cm. long; bracts ovate, acute or acuminate, imbricated, about 6 mm. long; calyx about 5 mm. long, the upper lobe ovate, the others lanceolate; corolla-tube 4–5 mm. long, the upper lobe about 3 mm. long; capsule sessile, glabrous, 4 mm. long, 4-seeded, the seeds globose.

Moist sandy soil, northern coastal plain, near Mayaguez, and between Caguas and Cayey, Porto Rico:—Mexico and central America; Brazil; Old World tropics.

2. THUNBERGIA Retz. Phys. Sallsk. Handl. 1: 163. 1776.

Herbs or herbaceous vines, with opposite, mostly hastate or cordate leaves, and large 2-bracted flowers solitary in the axils, or in terminal racemes. Bracts foliaceous, large. Calyx short, annular. Corolla with an oblique, more or less flattened tube enlarged above, and a spreading 5-lobed limb, the lobes rounded, contorted, nearly equal. Stamens 4, didynamous, borne near the base of the

corolla-tube, the filaments thickened below, the anthers with an apiculate connective. Disk fleshy. Ovary fleshy; style dilated at the apex; ovules 2 in each cavity. Capsule coriaceous, globose, abruptly beaked, loculicidally dehiscent. [Commemorates Karl P. Thunberg, 1743-1828, eminent Swedish traveller and botanist.] About 40 species, natives of the Old World tropics. Type species: *Thunbergia capensis* Retz.

Petioles not winged-margined.
Petioles wing-margined.

1. *T. fragrans*.
2. *T. alata*.

1. **Thunbergia fragrans** Roxb. Pl. Corom. 1: 47. 1795.

Thunbergia volubilis Pers. Syn. 2: 179. 1806.

A slender, finely pubescent vine, often 2 m. long, usually climbing. Leaves ovate or ovate-lanceolate, 5-10 cm. long, remotely few-toothed toward the base or entire, acuminate at the apex, subtruncate, hastate or cordate at the base, the slender petioles 1-4 cm. long; peduncles rather stout, 2-7 cm. long; bracts lanceolate or ovate-lanceolate, pubescent, acuminate, 1.5-2 cm. long; calyx deeply cleft, much shorter than the bracts; corolla white, 2.5-3 cm. long, its lobes crenate, nearly as long as the tube; capsule depressed-globose, pubescent, about 8 mm. in diameter, tipped by a stout subulate beak 1-1.5 cm. long.

Roadsides, thickets and waste grounds, naturalized after cultivation for ornament, Porto Rico; St. Croix; St. Thomas; St. Jan; Tortola:—West Indies. Native of the Old World tropics. WHITE THUNBERGIA.

2. **Thunbergia alata** Bojer; Sims. Bot. Mag. pl. 2591. 1825.

A pubescent vine, usually not more than 1 m. long, trailing or climbing. Leaves ovate or triangular-ovate, 4-8 cm. long, remotely few-toothed or entire, acute at the apex, cordate or hastate at the base, the wing-margined petioles as long as the blades or shorter; peduncles slender, mostly longer than the petioles; bracts ovate-lanceolate, acute or acuminate, pubescent, about 1.5 cm. long; calyx cleft to about the middle; corolla yellow or white, usually with a purple eye, 2.5-4 cm. long; capsule depressed-globose, pubescent, 8-10 mm. in diameter, its stout beak about 1 cm. long. [*T. capensis* of Krebs.]

Roadsides, waste and cultivated grounds, naturalized after cultivation for ornament, Porto Rico; St. Croix; St. Thomas; St. Jan; Tortola:—West Indies; Mexico and continental tropical America. Native of eastern Africa. WINGED THUNBERGIA. REDADERA.

Thunbergia grandiflora Roxb., East Indian, grown for ornament in Porto Rico and Virgin Island gardens, is a long woody vine, with thick, broadly ovate, cordate dentate petioled leaves 1-2 dm. long, and long-peduncled flowers, the calyx truncate, the large corolla with a yellowish limb and purple throat.

3. **HYGROPHILA** R. Br. Prodr. 479. 1810.

Herbs, with opposite entire leaves, often with cystoliths, the flowers sessile and fascicled or solitary in the axils. Calyx 5-cleft, the narrow segments nearly alike. Corolla-tube subcylindric, the limb strongly 2-lipped, the upper lip 2-toothed, the lower 3-lobed, its lobes sinistrorsely contorted. Perfect stamens 4, didynamous, borne on the corolla-tube; anthers 2-celled, their sacs unappendaged. Ovules mostly 4-several in each ovary-cavity. Capsule narrowly oblong. [Greek, swamp-loving.] About 30 species, natives of tropical regions. Type species: *Hygrophila angustifolia* R. Br.

1. **Hygrophila brasiliensis** (Spreng.) Lindau in Urban, Symb. Ant. 2: 183. 1900.

Ruellia brasiliensis Spreng. Syst. 2: 822. 1825.

Hygrophila portoricensis Nees in DC. Prodr. 11: 92. 1847.

Stems 4-angled, rather stout, branched, 0.5–2 m. high, the young branches pubescent. Leaves oblong-lanceolate to elliptic, strongly pinnately veined. Stem stout, erect, 4-sided, usually branched, 0.5–2 m. high, the branches pubescent when young. Leaves oblong to oblong-lanceolate, 6–15 cm. long, pinnately veined, somewhat pubescent on the veins beneath, the apex acute or acuminate, the base narrowed, the petioles 0.5–3 cm. long; flowers fascicled in the axils; calyx-segments linear-lanceolate, about 8 mm. long; corolla white, 10–12 mm. long, the tube about as long as the limb; capsule glabrous, about 12 mm. long, 12–18-seeded.

Borders of streams and lagoons:—Cuba; Hispaniola; continental tropical America. YERBA DE HICOTEÁ.

4. **BLECHUM** P. Br.; Juss. Ann. Mus. Paris 9: 269. 1807.

Perennial herbs, with repand-dentate or entire, petioled leaves, and small flowers in dense terminal spikes, the large foliaceous bracts imbricated. Calyx 5-parted, the slightly unequal segments linear-subulate. Corolla with a slender tube little expanded above and a spreading, nearly equally 5-lobed limb, the lobes rounded. Stamens 4, didynamous, borne at or above the middle of the corolla-tube; anthers oblong, their sacs parallel. Ovules few or several in each ovary-cavity; style with a subulate apex. Capsule ovate or suborbicular with a short, narrowed base. Seeds orbicular. [Name Greek, originally applied to some different plant.] About 4 species, natives of tropical America. Type species: *Ruellia Blechum* L.

1. **Blechum Blechum** (L.) Millsp. Field Mus. Bot. 2: 100. 1900.

Ruellia Blechum L. Syst. ed. 10, 1120. 1759.

Barleria pyramidata Lam. Encycl. 1: 380. 1785.

Blechum Brownei Juss. Ann. Mus. Paris 9: 270. 1807.

Blechum Brownei subcordatum Kuntze Rev. Gen. Pl. 483. 1891.

Ruellia parviflora Sessé & Moc. Fl. Mex. ed. 2, 147. 1894.

Blechum pyramidatum Urban, Repert. 15: 323. 1918.

Annual, puberulent, erect or ascending, 2–7 dm. high, branched, the branches slender. Leaves ovate, thin, petioled, 2–7 cm. long, acute at the apex, obtuse or narrowed at the base; spikes dense, 4-sided, 3–6 cm. long; bracts ovate, pinnately veined, 1–1.5 cm. long, loosely strigose and ciliate, acutish at the apex, rounded at the base; corolla whitish, a little longer than the subtending bract; capsule oblong, puberulent, about 6 mm. long. [? *Blechum Brownei laxum* of Kuntze.]

Banks, fields, woods and thickets, sometimes in cultivated grounds, Porto Rico, at lower and middle elevations; Mona; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—West Indies; continental tropical America. YERBA DE PAPAGAYO.

5. **RUELLIA** L. Sp. Pl. 634. 1753.

Perennial herbs, or shrubs, mostly pubescent, with entire or rarely dentate leaves and large flowers, solitary or clustered in the axils, or cymose in terminal panicles. Calyx 5-cleft or 5-parted, the segments narrow. Corolla funnellform or salverform, the tube usually narrow, slightly enlarged above, the limb spread-

ing, 5-lobed, the lobes obtuse. Stamens 4, didynamous. Anther-sacs not mucronate at the base. Apex of the style recurved; stigma simple, or of 2 unequal lobes. Capsule oblong or club-shaped. Seeds compressed, ovate or orbicular, attached by their edges to the retinacula. [Named for I. De la Ruelle, 1474–1537, an early French herbalist.] About 200 species, mainly of tropical America. Type species: *Ruellia tuberosa* L.

Low; pubescent; corolla purple, 4–6 cm. long.
Tall; glabrate; corolla 2.5–3 cm. long, scarlet.

1. *R. tuberosa*.
2. *R. coccinea*.

1. ***Ruellia tuberosa* L. Sp. Pl. 635. 1753.**

(?) *Ruellia clandestina* L. Sp. Pl. 634. 1753.

Cryphiacanthus barbadensis Nees, Del. Sem. Hort. Vrat. 1841.

Roots narrowly fusiform, clustered; stem erect or ascending, branched or simple, 2–6 dm. high, finely pubescent. Leaves ovate or oblong, 10 cm. long or less, undulate, finely pubescent, narrowed into margined petioles; cymes several-flowered, peduncled; bracts narrow, small; calyx hispid-pubescent, its linear lobes 12–20 mm. long; corolla purple, 4–6 cm. long, its tube rather abruptly expanded above; capsules puberulent, about 1.5 cm. long. [*Ruellia dichotoma* of Sessé & Moçino, not of Bertero.]

Dry sandy or gravelly soil at low elevations, Porto Rico, in the eastern and southern districts; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—southeastern United States; West Indies; continental tropical America. MANY-ROOTS.

2. ***Ruellia coccinea* (L.) Vahl, Symb. 3: 83. 1794.**

Barleria coccinea L. Sp. Pl. 637. 1753.

Arrhoxylon coccineum Nees in Mart. Fl. Bras. 9: 63. 1847.

Stemonacanthus coccineus Griseb. Fl. Br. W. I. 452. 1861.

Herbaceous, somewhat woody, 0.5–2 m. high, branched, the young branches puberulent. Leaves ovate to ovate-lanceolate, crenate, 3–9 cm. long, pubescent or glabrate, the apex acuminate or acute, the base narrowed or rounded, the petioles 0.5–3 cm. long; flowers solitary or few in the axils, sessile or peduncled, leafy-bracted; calyx-segments narrowly linear-lanceolate, pilose, unequal, 6–8 mm. long; corolla scarlet, puberulent, 2.5–3 cm. long, the somewhat curved tube about twice as long as the limb, the lobes rounded; capsule puberulent, stipitate, about 1 cm. long.

Shaded banks, thickets and woodlands, Porto Rico, at lower and middle elevations in wet or moist districts; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Hispaniola; recorded from Guadeloupe and Dominica. Showy and conspicuous when in flower. MARAVILLA.

***Ruellia strepens* L.**, a North American species, is recorded by de Candolle as found on St. Croix by Isert, presumably an error in locality.

***Ruellia serpens* L.**, recorded by Krebs from St. Thomas, is wholly dubious, as Linnaeus published no such species; *R. serpens* Nees is a Javan plant.

6. ***BARLERIA* L. Sp. Pl. 636. 1753.**

Shrubs or herbs, with opposite entire leaves, our species with axillary spines and yellow flowers. Calyx deeply 4-cleft, 2 of the segments larger than the others. Corolla-tube about as long as the spreading limb or longer, the limb with 5 rounded lobes. Stamens 4, didynamous, borne on the base of the corolla-tube, unequal. Disk small. Style elongated; stigma obtuse; ovules 2 in each ovary-cavity.

Capsule ovoid to oblong. Seeds flattened, ovate or suborbicular. [Commemorates Jacques Barrelier, 1634–1673, French botanist.] Perhaps 100 species or more of tropical regions, mostly of the Old World. Type species:—*Barleria Prionitis* L.

Bracts suborbicular to ovate, aristulate.
Bracts lanceolate, aristate.

1. *B. lupulina*.
2. *B. Prionitis*.

1. ***Barleria lupulina*** Lindl. Bot. Reg. pl. 1483. 1832.

Shrubby; stem branched, glabrous, 0.5–1 m. high, armed with 2 acicular spines at the leaf-axils, the spines about 2 cm. long or shorter. Leaves narrowly oblong, dark green, glabrous, 6–15 cm. long, the apex narrowed and aristulate, the base narrowed, the petioles about 1 cm. long or shorter; flowers in dense thick terminal bracted spikes 4–7 cm. long; bracts suborbicular to ovate, puberulent, aristulate; calyx about 1 cm. long; corolla bright yellow, 2–3 cm. long; capsule 10–15 mm. long.

Waste grounds, St. Thomas; St. Jan:—Jamaica; Hispaniola; Antigua; Montserrat; Martinique; St. Vincent; Grenada; Barbados. Native of Madagascar.

2. ***Barleria Prionitis*** L. Sp. Pl. 636. 1753.

Shrubby, branched, glabrous, or the leaves pubescent when young, 3–12 dm. high, armed with acicular spines at the axils, the spines about 2 cm. long or shorter. Leaves elliptic to oblong, narrowed at both ends, acute or acuminate, 3–9 cm. long, light green, the petioles about 2 cm. long or shorter; flowers sessile in the axils and in terminal bracted spikes; bracts oblong-lanceolate, aristate, 1.5–2 cm. long; calyx 12–15 mm. long; corolla yellow, 3–4 cm. long; capsule pointed, about 2 cm. long.

Roadside, Mayaguez, Porto Rico, 1923, escaped from cultivation:—Jamaica; Gadeloupe; Grenada; Barbados. Native of tropical Asia and Africa.

Barleria aristata L., East Indian, grown in 1925 at the Trujillo Plant Propagation Station, in spineless, with cristate bracts.

7. **ANTHACANTHUS** Nees; DC. Prodr. 11: 460. 1847.

Slender, much-branched shrubs armed with opposite axillary, curved or straight spines, the leaves small, entire, often fascicled in the axils, the solitary or fascicled flowers axillary, slender-peduncled. Calyx 5-cleft. Tube of the small corolla cylindric, somewhat enlarged above, the limb spreading, unequally 5-lobed. Stamens 2; filaments short; anthers oblong, 2-celled; staminodia 2, clavate or filiform. Style filiform; ovules 2 in each cavity of the ovary. Capsule oblong, stipitate. Seeds 4 or fewer, compressed, tubercled. [Greek, spiny flower.] About 6 species, natives of the West Indies, the following typical:

1. ***Anthacanthus spinosus*** (Jacq.) Nees, in DC. Prodr. 11: 460. 1847.

Justicia spinosa Jacq. Enum. 11. 1760.

Jasminum coeruleum Kuntze, Rev. Gen. Pl. 410. 1891.

A shrub, erect or diffuse, 2 m. high or less, the long slender branches pubescent or glabrous, the stiff subulate spines more or less recurved, 4–12 mm. long. Leaves coriaceous, glabrous or nearly so, ovate to oblong, elliptic or oblanceolate, 3–20 mm. long, obtuse, acute or emarginate at the apex, narrowed or obtuse at the base, the midvein rather prominent, the lateral venation obscure, the petioles very short; flowers few or solitary at the axils; peduncles 6–10 mm.

long; calyx 3–4 mm. long, its lobes lanceolate, acute; corolla purple or violet, puberulent or glabrous, its tube about 8 mm. long, its oblong lobes about as long as the tube; style filiform, about 10 mm. long; capsule about 2 cm. long; seeds wrinkled, 2–3 mm. in diameter. [*A. armatus* of Bello and of Krebs, not of Nees; *A. microphyllus* and *A. jamaicensis* of Eggers.]

Hillsides, woods and thickets, Porto Rico, at lower and middle elevations; Culebra, Icaos; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Bahamas; Jamaica; Cuba; Hispaniola; recorded from Antigua and Martinique. PRICKLY BUSH. ESPINOSA.

Anthacanthus acicularis (Sw.) Nees, attributed by West and by Lindau to St. Croix, appears to be restricted to Jamaica.

S. **LEPIDAGATHIS** Willd. Sp. Pl. 3: 400. 1801.

Herbs or low shrubs often with cystoliths, with opposite entire leaves and small bracted densely spicate flowers. Calyx unequally 5-parted, the 2 lower segments connate. Corolla with a slender subcylindric tube and a 2-lipped limb, the upper lip 2-cleft or emarginate, the lower 3-lobed. Stamens 4 didynamous; filaments short; anther-sacs blunt. Ovules 2 in each ovary-cavity; style entire. Capsule oblong, pointed, with 4 seeds or fewer. Seeds nearly orbicular, flat. [Greek, referring to the bracted inflorescence.] About 50 species, mostly of the Old World tropics, a few American. Type species: *Lepidagathis cristata* Willd.

1. ***Lepidagathis alopecuroidea*** (Vahl) R. Br.; Griseb. Fl. Br. W. I. 453. 1861.

Ruellia alopecuroidea Vahl, Eclog. 2: 49. 1798.

Teliostachya alopecuroidea Nees in Mart. Fl. Bras. 9: 72. 1847.

Herbaceous; stem usually branched, erect, decumbent or ascending, 4-angled, short-pilose, 1–5 dm. long, sometimes rooting at the lower nodes. Leaves thin, ovate to elliptic, repand or entire, 3–8 cm. long, the apex acute or obtuse, the base narrowed, the petioles about 2 cm. long or shorter; spikes mostly terminal, many-flowered, 2–8 cm. long, 10–15 mm. thick; flowers clustered in the spikes; bracts lanceolate to oblong, venose, ciliate, about 6 mm. long; calyx-segments 4–6 mm. long; corolla white to violet, about as long as the calyx; capsule sessile, glabrous, 4-seeded, about 4 mm. long.

Wet shaded banks, woodlands and forests, Porto Rico:—Hispaniola; Antigua to Trinidad; continental tropical America. PATA DE GALLINA.

9. **GERARDIA** [Plum.] L. Sp. Pl. 610. 1753.

[*STENANDRIUM* Nees, in Lindl. Introd. Nat. Syst. ed. 2, 444. 1836.]

Low and small pubescent perennial herbs, acaulescent or nearly so, the leaves in a basal tuft, the pink, white or purple flowers spicate on bracted scapes. Calyx-lobes 5, narrow, nearly equal. Corolla with a slender tube, enlarged into a slightly curved throat, the oblique 5-lobed limb spreading, the lobes unequal and imbricated. Stamens 4, didynamous, included, the anthers 1-celled. Ovules 2 in each cavity of the ovary; stigma 2-lobed. Capsule fusiform or narrowly oblong. Seeds flattened, rough or pubescent. [Commemorates John Gerard, 1545–1607, famous English herbalist.] About 25 species, of tropical and subtropical America, the following typical.

Rootstock elongated; roots filiform, bearing oblong tubers
Rootstock very short; roots thickened.

1. *G. tuberosa*.
2. *G. portoricensis*.

1. *Gerardia tuberosa* L. Sp. Pl. 610. 1753.*Ruellia rupestris* Sw. Prodr. 93. 1788.*Stenandrium rupestre* Nees in DC. Prodr. 11: 283. 1847.*Stenandrium tuberosum* Urban, Symb. Ant. 4: 576. 1911.

Acaulescent; rootstock elongated; roots filiform, bearing oblong tubers 1–1.5 cm. long. Leaves entire, slender-petioled, elliptic to oblong, spreading; loosely pilose, 2–4 cm. long, the apex rounded, the base obtuse or narrowed; scapes slender, pilose, about as long as the petioles or shorter, few-several-flowered; bracts nearly linear, 6–7 mm. long; calyx-segments about 3 mm. long; corolla pinkish, 8–10 mm. long, the tube about as long as the limb; capsule about 5 mm. long, glabrous.

Forests and hillsides at lower and middle elevations in moist or wet districts, Porto Rico; Vieques; St. Thomas; St. Jan:—Hispaniola; St. Martin; Guadeloupe.

2. *Gerardia portoricensis* Britton & Wilson, spec. nov.

Acaulescent, with numerous thickened roots, the rootstock very short. Leaves soft-pubescent, the blades oblong or elliptic, 2–2.5 cm. long, 0.8–1.2 mm. wide, the apex obtuse or acutish, the base obtuse, the slender petioles 1–2 cm. long; only very young inflorescence seen.

Limestone hills near Guanica and Guayanilla, Porto Rico. Type from Salinas de Guanica (Britton & Boynton 8288). Endemic.

10. *ODONTONEMA* Nees, Linnaea 16: 300. 1842.

Large herbs, or shrubs, with broad opposite entire leaves, and large flowers in terminal narrow panicles, the bracts small. Calyx short, 5-parted, the segments narrow. Corolla with a slender tube and a 2-lipped or nearly regular limb. Perfect stamens 2, the anthers 2-celled, the sacs blunt; staminodia 2. Ovules 2 in each ovary cavity; style filiform. Capsule oblong, stipitate, with 4 seeds or fewer. [Greek, toothed-thread.] About 20 species, natives of tropical America. Type species: *Odontonema lucidum* Nees.

1. *Odontonema nitidum* (Jacq.) Kuntze, Rev. Gen. Pl. 494. 1891.*Justicia nitida* Jacq. Enum. 11. 1760.*Thyrsacanthus nitidus* Nees in DC. Prodr. 11: 327. 1847.

A shrub, 1–3 m. high, with slender glabrous branches. Leaves oblong to elliptic, thin, 1–2 dm. long, 2–7 cm. wide, the apex acuminate, the base narrowed, the glabrous or sparingly pilose petioles 1–2 cm. long; panicles slender, simple or branched, longer than the leaves; pedicels 5–10 mm. long, calyx about 3 mm. long, its segments lanceolate, acuminate; corolla white or purplish, about 16 mm. long, 2-lipped, the lips about as long as the tube; capsule glabrous, about 15 mm. long; seeds warty.

Recorded as formerly collected on St. Croix and St. Thomas:—St. Kitts to Tobago.

Odontonema cuspidatum (Nees) Kuntze, Mexican, planted for ornament in Porto Rico gardens, is a shrub with broadly elliptic sometimes white-mottled leaves, the flowers white or purplish, the corolla-limb nearly regular [*Thyrsacanthus cuspidatus* Nees.]

Odontonema strictum (Nees) Kuntze, of Central America, grown for ornament in Porto Rico gardens, is a shrub up to 3 m. tall, with very narrow panicles of bright red flowers, the corolla about 2.5 cm. long, its nearly regular limb about one-half as long as the slender tube.

11. **DIAPEDIUM** Konig; Konig & Sims. Ann. Bot. 2: 189. 1805.[*DICLIPTERA* JUSS. Ann. Mus. Paris 9: 267. 1807.]

Herbs, with entire petioled leaves, and blue, red or violet flowers subtended by involucre of 2-4 bracts, the inflorescence mostly cymose or spicate, the involucre subtending 1 flower or several. Calyx 4-5-cleft, the lobes linear or subulate. Corolla-tube slender, slightly enlarged above; upper lip erect, concave, interior in the bud; lower lip spreading, entire or 3-toothed. Stamens 2; anther-sacs parallel, sometimes unequal, separated by a narrow connective. Style filiform; ovules 2 in each cavity of the ovary. Capsule flattened, ovate or sub-orbicular, 2-4-seeded. Placentae separating elastically from the walls of the capsule. Seeds compressed, nearly orbicular. About 60 species, of warm and tropical regions. Type species: *Justicia chinensis* L.

Bracts narrow, lanceolate to cuneate.

1. *D. assurgens*.

Bracts broad, ovate, apiculate.

2. *D. Krugii*.1. **Dianedium assurgens** (L.) Kuntze, Rev. Gen. Pl. 485. 1891.*Justicia assurgens* L. Syst. ed. 10, 850. 1759.*Dicliptera assurgens* Juss. Ann. Mus. Paris 9: 269. 1807.*Dicliptera portoricensis* Spreng.; Schult. Mant. 1: 149. 1822.

Erect, often much branched, glabrous or somewhat puberulent, 3-15 dm. high. Leaves ovate to oblong-lanceolate, 4-10 cm. long or the upper smaller, acute or obtuse at the apex, obtuse or narrowed at the base, the petioles slender; flowers in small bracted clusters, in slender interrupted, simple or branched spikes 5-15 cm. long; bracts lanceolate or spatulate, 8-15 mm. long; calyx about 4 mm. long, its linear-lanceolate lobes as long as the tube or longer; corolla scarlet or red, 2-2.5 cm. long, its tube curved, its lips lanceolate; capsule 5-6 mm. long. [*Dicliptera scorpioides* of Sprengel, not of Jussieu.]

Hillsides near Rincon, Porto Rico; St. Croix; St. Thomas; St. Jan.:—Florida; West Indies; continental tropical America.

2. **Diapedium Krugii** (Urban) Britton.*Dicliptera Krugii* Urban, Symb. Ant. 4: 577. 1911.

Erect, branched, 6 dm. high or higher, the twigs pilose when young. Leaves ovate to ovate-oblong, 5-6 cm. long or the upper ones smaller, sparingly pilose, the apex acuminate, the base obtuse or rounded, the petioles 3 cm. long or shorter, flowers axillary in small clusters on the branches, sessile or nearly so; bracts elliptic to orbicular-ovate, apiculate, short-pilose, 10-15 mm. long; calyx about 4 mm. long, with linear-lanceolate lobes; corolla rose, about 2.5 mm. long, its lips nearly equal; capsule about 6 mm. long.

Shaded hillsides, Pellejas near Utuado, collected only by Sintenis. Included by Lindau in *D. martinicense* (Jacq.) Kuntze. Endemic.

12. **DREJERELLA** Lindau in Urban, Symb. Ant. 2: 222. 1900.

Shrubs, or large cystolithigerous herbs, with opposite petioled leaves, the rather large flowers in terminal bracted spikes, the bracts imbricated. Calyx 5-parted. Corolla 2-lipped, the upper lip 2-toothed, the lower 3-lobed. Stamens 2, borne on the corolla-throat, the anther-sacs calcarate. Ovules mostly 2 in each ovary-cavity. Capsule short-stipitate, mostly 4-seeded. [Diminutive of *Drejera*.] A few species of tropical America, the following typical.

1. *Drejerella mirabiloides* (Lam.) Lindau in Urban, Symb. Ant. 2: 222. 1900.*Justicia mirabiloides* Lam. Tabl. Encycl. 1: 30. 1791.*Beloperone portoricensis* Nees in DC. Prodr. 11: 414. 1847.

Herbaceous, somewhat woody, erect, branched, 0.5–1 m. high, the branches pubescent in 2 lines, often constricted above the nodes. Leaves ovate to ovate-lanceolate, pilose or glabrate, 4–12 cm. long, entire or undulate, the apex acuminate, the base narrowed or obtuse, the petioles 1–3 cm. long; spikes rather dense, 2–4 cm. long; bracts ovate, acute or short-acuminate, ciliate, pilose or glabrate; calyx-segments lanceolate, about 10 mm. long; corolla pink, rose or purple, puberulent, about 2.5 cm. long, the upper lip a little shorter than the tube; capsule 10 mm. long. [*Beloperone nemorosa* of Eggers and of Krebs.]

Thickets, hillsides and forest borders, Porto Rico, at lower and middle elevations in moist districts; St. Croix; St. Thomas; St. Jan:—Cuba; Hispaniola; Martinique and Tobago (according to Lindau).

13. *JUSTICIA* [Houst.] L. Sp. Pl. 15. 1753.

Herbs, or shrubs, with entire leaves, often cystolithigerous, the flowers spicate or solitary. Calyx deeply cleft, its segments narrow, nearly equal. Corolla-tube shorter or longer than the 2-lipped limb, the upper lip 2-cleft, the lower 3-cleft. Stamens 2, borne on the throat of the corolla; anthers 2-celled; staminodia none; lower anther-sac often appendaged. Style filiform; ovules 2 in each ovary-cavity. Capsule oblong or obovate. [In honor of James Justice, a Scotch gardener.] Over 100 species, of tropical distribution. Type species: *Justicia Adhatoda* L.

Calyx 5-parted; leaves petioled.

Bracts oblong to cuneate, truncate.

Bracts linear to lanceolate.

Flowers mostly in terminal spikes; capsule oblong.

Flowers axillary, solitary; capsule obovate.

Calyx 4-parted; flowers few or solitary in the axils.

Leaves sessile or nearly so.

Leaves slender-petioled.

1. *J. carthaginensis*.2. *J. periplocifolia*.3. *J. culebratae*.4. *J. sessilis*.5. *J. (?) borinquensis*.1. *Justicia carthaginensis* Jacq. Enum. 11. 1760.*Adhadota carthaginensis* Nees in DC. Prodr. 11: 403. 1847.

Herbaceous, somewhat woody, erect, branched, 0.5–1.5 m. high, the branches and leaves glabrous or very sparingly pubescent. Leaves ovate or elliptic-ovate, membranous, 5–12 cm. long, acuminate at the apex, narrowed or rounded at the base, somewhat decurrent on the petioles; flowers violet to purple, in dense terminal bracted spikes 3–7 cm. long; bracts oblong, pubescent or ciliate, 12 mm. long or less, the lower pointed, the upper truncate and cuneate; bractlets narrower than the bracts; calyx-segments lanceolate, about 1 cm. long; corolla purple, its tube about 1.5 cm. long, the upper lip about as long as the tube, the lower somewhat longer; capsule 1.5–2 cm. long, acute, pubescent.

Woodlands, hillsides and waste grounds, St. Croix; St. Thomas; Tortola:—Bahamas Hispaniola; St. Kitts to Trinidad; Aruba; continental tropical America.

2. *Justicia periplocifolia* Jacq. Coll. 5: Suppl. 5. 1796.*Justicia vulgaris* Bert.; Schultes, Mant. 1: 135. 1822.*Adhatoda reflexiflora* Nees in DC. Prodr. 11: 398. 1847.*Justicia reflexiflora glandulosa* Eggers, Bull. U. S. Nat. Mus. 13: 80. 1879.*Ecbolium reflexiflorum* Kuntze, Rev. Gen. Pl. 487. 1891.

Shrubby, slender, branched or sometimes simple, 0.4–1.5 m. high, glabrous, or puberulent above. Leaves linear to lanceolate or ovate, membranous, gla-

brous, 5–12 cm. long, 0.5–4 cm. wide, the apex acuminate, the base narrowed, the slender petioles about 1.5 cm. long or shorter; flowers in terminal spikes, or sometimes solitary in the axils; bracts linear-lanceolate, pubescent; calyx-segments linear-lanceolate, puberulent, 7–10 mm. long; corolla pilose, purple, 2–3 cm. long, the tube somewhat longer than the limb; lower anther-sac calcarate; capsule compressed, about 1 cm. long, densely puberulent, tipped. [*Dicliptera assurgens* of Stahl, not of Jussieu.]

Thickets, hillsides and woodlands, Porto Rico, at lower and middle elevations; Mona; Culebra; Vieques; St. Croix; St. Thomas; St. Jan:—Hispaniola; Mexico; Venezuela.

3. *Justicia culebritae* Urban, Repert. 16: 41. 1919.

Somewhat woody, branched, about 2 dm. high, the branches minutely puberulent or glabrous. Leaves lanceolate to ovate, thin, 2–4.5 cm. long, glabrous, the apex acute or acuminate, the base narrowed or rounded, the petioles 5–10 mm. long; flowers solitary in the axils, subsessile; bracts linear, 3–6 mm. long; calyx-segments linear, about 8 mm. long; corolla purple, pilose, about 2 cm. long, the limb shorter than the tube; capsule obovate, acute, narrowed below, densely short-pilose, about 1 cm. long.

Dry shaded hillside, Culebrita, collected only by Britton and Wheeler in March 1906. Endemic.

4. *Justicia sessilis* Jacq. Enum. 11. 1760.

Dianthera sessilis Gmelin, Syst. 2: 35. 1791.

Rhytiglossa sessilis Nees in DC. Prodr. 11: 345. 1847.

Adhatoda tetramera Bello, Anal. Soc. Esp. Hist. Nat. 10: 301. 1881.

Justicia pauciflora Vahl, Eclog. 1: 2. 1796.

Somewhat woody, branched, 1–8 dm. high, the slender branches pubescent in 2 lines. Leaves ovate to elliptic, sessile or very short-petioled, sparingly pilose, 1–3.5 cm. long, the apex acute or obtuse, the base rounded; flowers 1–3 in the upper axils, sessile; bractlets about 2 mm. long, pilose; calyx 4-parted, the lanceolate segments about 4 mm. long; corolla purple, puberulent, its slender tube about 10 mm. long, its lips 6–7 mm. long; anther-sacs obtuse; capsule glabrous, pointed, compressed, stipitate, 10–12 mm. long.

Rocky hillsides and thickets at lower elevations in the dry southwestern districts of Porto Rico; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—St. Martin to Guadeloupe; Trinidad; Margarita Colombia.

5. *Justicia* (?) *borinquensis* Britton, sp. nov.

Herbaceous, low; stems slender, pilose, 5–10 cm. long. Leaves ovate to suborbicular, 8–17 mm. long, membranous, entire or slightly repand, the apex rounded or obtuse, the base narrowed or rounded, the villous petioles 2–5 mm. long, the upper surface with scattered cystoliths and a few long whitish hairs, the under side pubescent, at least on the veins; flowers solitary, sessile; calyx-segments apparently 4, linear-lanceolate, pilose, about 5 mm. long; capsule narrowly oblong, puberulent, 7 mm. long; corolla unknown.

Bank, Monte Cerrote near Adjuntas, Porto Rico (N. L. Britton and Stewardson Brown, 5394). Endemic.

Justicia secunda Vahl, native of northern South America, grown for ornament in Virgin Island gardens, is a tall shrub, with large, long-petioled, ovate to ovate-lanceolate, acuminate leaves and long narrow panicles of red or red-purple flowers, the corolla 3–4 cm. long.

Justicia reptans Sw., listed by Krebs as found in St. Thomas, presumably in error, inhabits Jamaica, Cuba and Hispaniola. [*Rhytiglossa reptans* Nees.]

14. **STETHOMA** Raf. Fl. Tell. 4: 61. 1838.

Slender branched cystolithigerous herbs, with entire or rarely undulate leaves, and small bracteolate white to purple flowers in slender or filiform, paniced, verticillate or umbellate spikes. Calyx 5-parted nearly to the base, the narrow segments nearly equal. Corolla-tube about equalling or shorter than the 2-lipped limb, the upper lip 2-toothed or 2-cleft, the lower lip 3-lobed. Stamens 2, borne at the throat of the corolla; anthers 2-celled, the sacs obtuse. Ovules 2 in each ovary-cavity. Capsule compressed, stipitate. [Greek, pectoral.] A few species of tropical America. Type species: *Justicia pectoralis* Jacq.

Inflorescence terminal; corolla 8–10 mm. long.

Panicle-branches alternate.

Panicle-branches opposite or verticillate.

Inflorescence axillary, the panicle-branches umbellate or also terminal and verticillate-paniculate; corolla 3–4 mm. long.

1. *S. pectoralis*.
2. *S. verticillaris*.
3. *S. comata*.

1. **Stethoma pectoralis** (Jacq.) Raf. Fl. Tell. 4: 61. 1838.

Justicia pectoralis Jacq. Enum. 11. 1760.

Dianthera pectoralis Gmelin, Syst. 2: 36. 1791.

Rhytiglossa pectoralis Nees in Mart. Fl. Bras. 9: 128. 1847.

Stem short-pilose in two lines, puberulent, at least above, erect, decumbent or ascending, sparingly branched, commonly rooting at the lower nodes, 2–6 dm. long. Leaves lanceolate to ovate-lanceolate, 3–10 cm. long, glabrous, acuminate, the base narrowed or obtuse, the petioles 2–12 mm. long; inflorescence terminal; panicle few-several-branched, the very slender branches alternate, 2–12 cm. long, the flowers rather distant; bracts and bractlets setaceous; calyx segments subulate, about 2 mm. long; corolla pink, puberulent, 8–10 mm. long; capsule not seen by us, apparently rarely formed.

Waste and cultivated grounds, Porto Rico; Mona; St. Croix; St. Thomas; St. Jan (according to Eggers);—Cuba; Hispaniola; St. Barts to Trinidad; continental tropical America. Recorded from Jamaica. CURIA.

2. **Stethoma verticillaris** (Nees) Britton.

Rhytiglossa verticillaris Nees in DC. Prodr. 11: 354. 1847.

Justicia verticillaris Urban, Symb. Ant. 4: 579. 1911. Not L. f. 1781.

Stem puberulent, erect or ascending, simple or little branched, 3–7 dm. long. Leaves lanceolate to oblong-lanceolate or ovate, entire or somewhat repand, 5–17 cm. long, the apex acuminate or acute, the base narrowed or obtuse, the petioles 0.5–2 cm. long; inflorescence terminal; panicle-branches opposite or verticillate, very slender, about 7 cm. long or shorter; bractlets linear; calyx-segments linear-lanceolate, acuminate, about 3 mm. long; corolla white or tinged with violet, 8–10 mm. long, its lower lip with 2 rows of brown blotches; capsule pubescent, stipitate, 6–7 mm. long. [Included by Lindau in *J. pectoralis* Jacq.]

Wet mountain forests of Porto Rico. Endemic.

3. **Stethoma comata** (L.) Britton.

Dianthera comata L. Syst. ed. 10, 850. 1759.

Justicia comata Lam. Encycl. 1: 632. 1785.

Leptostachya comata Nees in DC. Prodr. 11: 381. 1847.

Glabrous or nearly so; stem weak, ascending or nearly erect, usually branched, often rooting at the lower nodes, 2–6 dm. high. Leaves lanceolate to oblong or ovate-oblong, 3–15 cm. long, the apex acuminate or acute, the base rounded or narrowed, sessile or with petioles about 2 cm. long or shorter; inflorescence axil-

lary, peduncled, the panicle-branches nearly filiform, 2–7 cm. long, umbellate, or also terminal and verticillate-paniculate; bracts and bractlets minute; calyx-segments lanceolate, 1.5–2 mm. long; corolla white or purplish, 3–4 mm. long; capsule stipitate, glabrous when mature, 4–5 mm. long.

Wet grounds at low elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Tobago; Trinidad; continental tropical America.

Eranthemum nervosum (Vahl) R. Br., BLUE ERANTHEMUM, East Indian, grown in Virgin Island gardens, is a pubescent or puberulent shrub up to 2 m. high, with thin, ovate or elliptic acuminate leaves, 1–2 dm. long, the flowers in axillary spikes, the large, whitish, strongly veined bracts densely imbricated, the blue 5-lobed corolla about 2 cm. broad. [*Justicia nervosa* Vahl.]

Pachystachys coccinea (Aubl.) Nees, of Trinidad and Guiana, grown for ornament in the Virgin Islands, is a glabrous shrub, 1–2 m. high, the stem and branches constricted above the nodes, the ovate to elliptic, thin entire leaves 1–2 dm. long, the showy flowers in dense short terminal spikes, the scarlet, 2-lipped corolla about 5 cm. long, the 2 stamens a little exserted.

Fittonia argyroneura E. Coëm., of western South America, occasionally grown for ornament in Porto Rico gardens, is a pubescent perennial with trailing or spreading branches, the leaves ovate, rounded, entire, 5–8 cm. long, dark green with conspicuous white veins; the yellowish flowers are in pedicelled spikes.

Pseuderanthemum reticulatum (Bull) Radlk., supposed to be of Polynesian origin, occasionally seen in Porto Rico gardens, is a shrub up to about 1.5 m. high, the somewhat fleshy, lanceolate leaves 1–2 dm. long, the rose-colored flowers in large terminal clusters, the corolla about 3 cm. broad. [*Eranthemum reticulatum* Bull.]

Pseuderanthemum bicolor (Schrank) Radlk., also probably Polynesian, grown for ornament in Porto Rico and Virgin Island gardens, is a glabrous shrub about 1 m. high, the ovate-lanceolate, acuminate leaves 1–2 dm. long, the flowers clustered in spikes with a nearly salverform white corolla with purple-spotted lobes, its slender tube 2.5–3 cm. long. [*Eranthemum bicolor* Schrank.]

Pseuderanthemum atropurpureum (Bull) Bailey, also probably Polynesian, occasionally grown in Virgin Island gardens, is shrubby, glabrous, 1–1.5 m. high, its broadly ovate, purple or mottled leaves mostly obtuse at both ends, its white or purplish flowers spicate; the corolla-tube 1–1.5 cm. long, the limb 2–2.5 cm. broad. [*Eranthemum atropurpureum* Bull.]

Crossandra infundibuliformis (L.) Nees, DOÑA JUANA, East Indian, grown for ornament in Porto Rico and Virgin Island gardens, is a shrub about 1 m. high with ovate to oblong-lanceolate, entire, slender-petioled leaves 6–12 cm. long, the flowers in dense terminal peduncled bracted spikes, the salmon to orange corolla with a slender tube about 2 cm. long and an oblique spreading lobed limb, the stamens 4. [*Justicia infundibuliformis* L.]

Graptophyllum pictum (L.) Griff., CAFE CON LECHE, CAFE DE JARDIN, CARICATURE PLANT, Australasian, grown for ornament in Porto Rico and Virgin Island gardens, is a shrub 2–2.5 m. high with elliptic entire short-petioled, usually yellowish-blotched leaves 1–2 dm. long, and large, purple-blue flowers in racemes, the corolla 7–8 cm. broad with a white throat and a 5-lobed limb. [*Justicia picta* L.; *G. hortense* Nees.]

Meypenia erecta (T. Anders.) Benth., of tropical Africa, also grown for ornament in Porto Rico and the Virgin Islands, is a shrub 1–2 m. high, with ovate, short-petioled entire or repand leaves 3–8 cm. long and solitary axillary peduncled flowers; the calyx minutely 10-toothed, the corolla 4–6 cm. long, with a yellowish tube and blue-purple limb. [*Thunbergia erecta* T. Anders.]

Sanchezia nobilis Hook., of Ecuador, occasional in Porto Rico gardens, is nearly herbaceous, with large oblong variegated leaves and paniced heads of yellow, red-bracted flowers about 5 cm. long.

Strobilanthes isophyllus (Nees) T. Anders., East Indian, luxuriant at the Trujillo Plant Propagation Station in 1925, a shrub 6–9 dm. high, has narrowly lanceolate leaves, the axillary peduncles with few blue and white flowers about 2.5 cm. long. [*Goldfussia isophylla* Nees.]

Strobilanthes Dyerianus Masters, Burmese, occasional in Porto Rico gardens, is shrubby, with opposite large iridescent leaves, purple beneath, the spicate violet flowers about 4 cm. long.

Hemigraphis colorata (Blume) Hallier, Javan, grown at the Trujillo Plant Propagation Station in 1925, is herbaceous, with ovate crenate purple leaves, the white spicate flowers about 2 cm. long. [*Ruellia colorata* Blume.]

Beleperone amherstiae Nees, Brazilian, grown at the Trujillo Plant Propagation Station in 1925, is a low shrub, with ovate, short-petioled leaves and crimson flowers about 5 cm. long in short axillary racemes [*Dianthera nodosa* B. & H.]

Beleperone eustachiana (Jacq.) Benth., recorded by Krebs as found in St. Thomas, is known only in the Lesser Antilles from St. Barts to Guadeloupe. [*Adhatoda eustachiana* Nees.]

Beleperone sphaerosperma (Vahl) Benth., also listed by Krebs from St. Thomas, is known only from St. Barts and St. Vincent. [*Adhatoda sphaerosperma* Nees.]

Adhatoda lithospermifolia (Jacq.) Nees, recorded by Krebs from St. Thomas, is a Peruvian species.

Family 16. **MYPORACEAE** Lindl.

MYOPORUM FAMILY.

Shrubs or trees, with alternate or opposite, entire stipulate leaves, and perfect, more or less irregular flowers, solitary or clustered in the axils. Calyx inferior, 5-parted. Corolla gamopetalous, its limb 2-lipped or oblique. Stamens 4, mostly didynamous, borne on the corolla-tube, the filaments filiform. Ovary usually 2-celled; style terminal; stigma terminal and small; ovules 1 in each ovary-cavity. Fruit a drupe. Five genera and 80 species or more, mostly Australian, only the following American.

1. **BONTIA** L. Sp. Pl. 638. 1753.

A tree or shrub, with alternate narrow fleshy entire pointed leaves, and rather small, purplish peduncled flowers, solitary or clustered in the axils. Calyx

5-parted, the segments imbricated. Tube of the corolla straight, cylindric, the limb deeply 2-lipped, the posterior lip concave, 2-cleft, the anterior lip recurved, 3-cleft, its middle lobe densely bearded. Stamens 4, didynamous; filaments thickened and villous near the base. Ovary 2-celled; ovules 4 in each cavity, superimposed in pairs; style very slender. Drupe ovoid, the exocarp fleshy, the endocarp bony, 2-celled. Seeds small, ovoid, with little endosperm. [Commemorates Peter Bontius, a Dutch naturalist and traveller of the seventeenth century.] A monotypic West Indian genus.

1. **Bontia daphnoides** L. Sp. Pl. 638. 1753.

A shrub or small tree, sometimes 9 m. high, nearly glabrous throughout, with terete, rather slender twigs. Leaves oblong or oblong-lanceolate, falling away from the twigs in drying, 10 cm. long or less, acuminate at the apex, narrowed at the base, the slender midvein prominent, the lateral venation obscure, the petioles 1–2 cm. long; peduncles slender, 1–3 cm. long; calyx-segments broadly ovate, subulate-tipped, about 3 mm. long, ciliolate; corolla about 2 cm. long, yellow, purple-blotched, or the lip purple within; drupe pointed, yellow, 1–1.5 cm. long.

Coastal thickets, dry southwestern districts of Porto Rico; St. Croix (according to Eggers); St. Thomas; St. Jan; Tortola:—West Indies: northern South America. WHITE ALLING.

Order 6. PLANTAGINALES.

Only the following family:

Family 1. **PLANTAGINACEAE** Lindl.

PLANTAIN FAMILY.

Herbs, with basal, or, in the caulescent species, opposite or alternate leaves, and small perfect polygamous or monoecious flowers, bracteolate in spikes or heads, or rarely solitary. Calyx 4-parted, inferior, persistent, the segments imbricated. Corolla hypogynous, scarious or membranous, mostly marcescent, 4-lobed. Stamens 4 or 2 (only 1 in an Andean genus), inserted on the tube or throat of the corolla; filaments filiform, exserted or included; anthers versatile, 2-celled, the sacs longitudinally dehiscent. Ovary sessile, superior; 1–2-celled, or falsely 3–4-celled. Style filiform, simple, mostly longitudinally stigmatic. Ovules 1–several in each cavity of the ovary, peltate, amphitropous. Fruit a pyxis, circumscissile at or below the middle, or an indehiscent nutlet. Seeds 1–several in each cavity of the fruit; endosperm fleshy; cotyledons narrow; rachis short, mostly straight. Three genera and over 225 species, of wide distribution.

1. **PLANTAGO** L. Sp. Pl. 112. 1753.

Leafy-stemmed, short-stemmed or acaulescent herbs, with opposite, alternate or basal leaves, bearing axillary or terminal spikes or heads of small greenish or purplish flowers (flowers solitary in a few exotic species). Calyx-segments equal, or two of them larger. Corolla salverform, the tube cylindric, or constricted at the throat, the limb spreading or reflexed in fruit, 4-lobed or 4-parted. Stamens 4 or 2. Ovary 2-celled, or falsely 3–4-celled; ovules 1–several in each cavity. Fruit a membranous pyxis, mostly 2-celled. Seeds various, sometimes hollowed out on the inner side. [The Latin name.] Over 200 species, of wide geographic

distribution. Type species: *Plantago major* L. The following are acaulescent weeds.

Leaves ovate; seeds many.

Leaves oblong-lanceolate; seeds 2.

1. *P. major*.

2. *P. lanceolata*.

1. ***Plantago major* L. Sp. Pl. 112. 1753.**

Plantago major tropica Griseb. Fl. Br. W. I. 389. 1861.

Perennial, glabrous or pubescent; rootstock short, thick, erect. Leaves long-petioled, mostly ovate, entire, or coarsely dentate, 2.5–25 cm. long, 3–11-ribbed; scapes 0.5–9 dm. high; spike linear-cylindric, usually dense, commonly blunt, 5–25 cm. long, 6–8 mm. thick; flowers perfect, proterogynous; sepals broadly ovate to obovate, scarious margined, one-half to two-thirds as long as the obtuse or subacute, 5–16-seeded pyxis; stamens 4.

Waste and cultivated grounds, Porto Rico; Mona; Vieques; St. Croix; St. Thomas; Tortola:—United States; Bermuda; West Indies; Central and South America. A widely distributed weed, native of the Old World. LLANTEN. GREATER PLANTAIN.

2. ***Plantago lanceolata* L. Sp. Pl. 113. 1753.**

Perennial or biennial, pubescent; rootstock short, erect, with tufts of brown hairs at the base of the leaves. Leaves narrowly oblong-lanceolate, shorter than the scapes, entire, acute or acuminate, gradually narrowed into petioles, 3–5-ribbed, 5–30 cm. long; scapes slender, channeled, sometimes 7.5 dm. tall; spikes dense, at first ovoid, becoming cylindric, blunt and 1–10 cm. long in fruit, 8–12 mm. thick; flowers perfect, proterogynous; sepals ovate, with a narrow green midrib and broad scarious margins, the two lower ones commonly united; corolla glabrous; filaments white; pyxis oblong, very obtuse, 2-seeded, slightly longer than the calyx, circumscissile at about the middle.

Garden weed, Condado, Porto Rico, 1922:—United States; Bermuda; Bahamas; Jamaica; Cuba; Native of the Old World. RIB-GRASS.

Order 7. RUBIALES.

Corolla gamopetalous. Anthers separate, the stamens as many as the corolla-lobes and alternate with them (one fewer in *Linnaea* of the Caprifoliaceae) or twice as many. Ovary compound, inferior, adnate to the calyx-tube. Ovules 1 or more in each cavity of the ovary. Leaves opposite or verticillate.

Leaves stipulate, often blackening in drying.

Leaves usually estipulate, not blackening in drying.

Fam. 1. RUBIACEAE.

Fam. 2. CAPRIFOLIACEAE.

Family 1. RUBIACEAE B. Juss.

MADDER FAMILY.

Herbs, shrubs, or trees, with simple, opposite or sometimes verticillate, mostly stipulate leaves, and perfect, often dimorphous or trimorphous, regular and nearly symmetrical flowers. Calyx-tube adnate to the ovary, its limb various. Corolla funnelform, club-shaped, campanulate, or rotate, 4–5-lobed. Stamens as many as the lobes of the corolla and alternate with them, inserted on its tube or throat. Ovary 1–10-celled; style simple or lobed; ovules 1– ∞ in each cavity. Fruit a capsule, berry, or drupe. Seeds various; seed-coat membranous or crustaceous; endosperm fleshy or horny (rarely wanting in a few genera); cotyledons ovate, cordate, or foliaceous.

A large family of some 340 genera and about 6,000 species, of wide distribution.

- A. Ovules more than one in each ovary-cavity.
- a. Fruit dry, capsular.
 - *Seeds wingless.
 - †Corolla-lobes valvate; our species herbs.
 - Seeds angled. 1. *Oldenlandia*.
 - Seeds crateriform, peltate. 2. *Clavenna*.
 - ††Corolla-lobes imbricated or contorted; shrubs. 3. *Rondeletia*.
 - **Seeds winged or appendaged.
 - Corolla-lobes contorted. 4. *Hillia*.
 - Corolla-lobes imbricated. 5. *Exostema*.
 - b. Fruit fleshy, baccate or coriaceous.
 - *Corolla-lobes valvate.
 - Inflorescence terminal.
 - Flowers densely capitate. 6. *Urceolaria*.
 - Flowers narrowly paniculate. 7. *Duggena*.
 - Inflorescence axillary.
 - Ovary 2-celled; prostrate herbs. 8. *Tontanea*.
 - Ovary 3-5-celled; woody plants. 9. *Sabicea*.
 - **Corolla-lobes imbricated, convolute or contorted.
 - Corolla-lobes contorted or convolute.
 - Shrubs or small trees; testa of the seed membranous; fruit small.
 - Ovary 2-celled. 10. *Randia*.
 - Ovary 1-celled. 11. *Gardenia*.
 - Large-leaved trees; testa fibrous; fruit large. 12. *Genipa*.
 - Corolla-lobes imbricated.
 - Ovary 4-5-celled; plants unarmed. 13. *Hamelia*.
 - Ovary 2-celled; spiny shrubs. 14. *Catesbaea*.

B. Ovule only one in each ovary-cavity.

 - a. Seed pendulous, the radicle superior.
 1. Stamens borne on the corolla-throat.
 - Fruit drupaceous; indehiscent.
 - Calyx-limb deciduous. 15. *Guettarda*.
 - Calyx-limb persistent.
 - Filaments short; stipules distinct. 16. *Stenostomum*.
 - Filaments filiform; stipules connate. 17. *Laugeria*.
 - Fruit dry, splitting. 18. *Machaonia*.
 2. Stamens borne on the base of the corolla-tube.
 - Corolla-lobes valvate.
 - Inflorescence terminal or also axillary; shrubs or small trees. 19. *Erithalis*.
 - Inflorescence axillary; vines or vine-like shrubs. 20. *Chiococca*.
 - Corolla-lobes imbricated.
 - Flowers 5-parted. 21. *Chione*.
 - Flowers 4-parted. 22. *Scolosanthus*.
 - b. Seed ascending, the radicle inferior.
 1. Corolla-lobes contorted or imbricated.
 - Corolla-lobes contorted; broad-leaved shrubs or trees.
 - Calyx nearly truncate. 23. *Coffea*.
 - Calyx-limb 4-5-dentate. 24. *Ixora*.
 - Corolla-lobes imbricated; low narrow-leaved shrub. 25. *Strumpfia*.
 2. Corolla-lobes valvate.
 - *Ovules basal.
 - †Ovary 2-celled, the septum thick.
 - Shrubs or trees, rarely large herbs, with mostly paniced or fascicled flowers.
 - Flowers in terminal, rarely axillary, panicles or corymbs. 26. *Psychotria*.
 - Corolla-tube short. 27. *Palicourea*.
 - Corolla-tube long. 28. *Lasianthus*.
 - Flowers in dense axillary fascicles. 29. *Geophila*.
 - Creeping herbs with capitate, long-peduncled flowers. 30. *Faramaea*.
 - ††Ovary 1-celled.
 - **Ovules lateral.
 - †Flowers confluent in a dense head; shrubs or trees; stipules not setiferous. 31. *Morinda*.
 - ††Flowers not confluent; herbs or low shrubs, the stipular sheath setiferous.
 - †Fruit 2-celled, indehiscent or dicoccous. 32. *Ernodea*.
 - Fruit fleshy, indehiscent.
 - Fruit dry, dicoccous or capsular.
 - Fruit dicoccous. 33. *Diodia*.
 - Cocci indehiscent.
 - Cocci opening on the inner side near the base. 34. *Hemidiodia*.

- Fruit capsular, longitudinally dehiscent.
 Both capsule-lobes dehiscent.
 One capsule-lobe dehiscent.
 ††Fruit 2-4-celled, circumscissile.

35. *Borreria*.
 36. *Spermacoce*.
 37. *Mitracarpus*.

1. *OLDENLANDIA* L. Sp. Pl. 119. 1753.

Herbs, with opposite leaves, and small white or pink flowers. Calyx-tube obovoid or subglobose, the limb 4-5-toothed. Corolla rotate or salverform, 4-5-lobed. Stamens 4 or 5, inserted on the throat of the corolla; anthers oblong. Ovary 2-celled; ovules numerous in each cavity; style slender, 2-lobed. Capsule small, ovoid, top-shaped or hemispheric, wholly adnate to the calyx-tube, locuicidally dehiscent at the summit. Seeds angular, not peltate; endosperm fleshy; embryo club-shaped. [Named for H. B. Oldenland, a Danish botanist.] About 175 species, mostly of tropical distribution. Type species: *Oldenlandia corymbosa* L.

Flowers filiform-pedicelled, or filiform-peduncled.

Flowers in cymes.

Flowers solitary or clustered in the axils.

Corolla about as long as the calyx-lobes; leaves linear-lanceolate.

Corolla much longer than the calyx-lobes; leaves suborbicular.

Flowers glomerate, rarely solitary, nearly sessile.

1. *O. corymbosa*.

2. *O. herbacea*.

3. *O. callitrichioides*.

4. *O. uniflora*.

1. *Oldenlandia corymbosa* L. Sp. Pl. 119. 1753.

Annual, glabrous or nearly so, erect or decumbent, branched, 2-5 dm. long. Stipules truncate, 1-1.5 mm. long, bearing one or more bristles; leaves sessile, linear or linear-lanceolate, 3.5 cm. long or less, 1-nerved, acute, usually scabrate above; cymes axillary, few-flowered, peduncled; pedicels filiform, 5-16 mm. long; calyx-tube scarcely 1 mm. long, the triangular lobes about as long; corolla white, about as long as the calyx-lobes; capsule subglobose, about 2 mm. in diameter.

Waste places, Government House yard, St. Croix, prior to 1876 (according to Eggers):—Jamaica; St. Kitts to Trinidad; continental tropical America.

2. *Oldenlandia herbacea* (L.) DC. Prodr. 4: 425. 1830.

Hedyotis herbacea L. Sp. Pl. 102. 1753.

Hedyotis commutata Schultes, Mant. 3: 134. 1827.

Hedyotis herbacea Sessé & Moc. Fl. Mex. ed. 2, 20. 1894.

Annual, weak, often decumbent, glabrous, branched, 1 m. long or less. Stipules 2-3 mm. long, 2-3-cuspidate; leaves linear to linear-lanceolate, 1-nerved, 2-7 cm. long, acute or acuminate, sessile; flowers solitary or clustered in the axils, filiform-peduncled, the peduncles 2.5 cm. long or less; calyx-tube about 1.5 mm. long, the lobes lanceolate, about as long; corolla white, about as long as the calyx-lobes; capsule depressed-globose, 3-4 mm. in diameter.

Moist soil and grassy hillsides in wet or moist regions of Porto Rico, ascending to higher elevations:—Jamaica; Cuba; Hispaniola; Montserrat; Guadeloupe; Martinique; Trinidad; recorded from St. Martin; continental tropical America; Old World tropics.

3. *Oldenlandia callitrichoides* Griseb. Mem. Am. Acad. 11. 8: 506. 1862.

Stems filiform, creeping, glabrous, 2-10 cm. long, rooting at the nodes. Leaves ovate-orbicular, very thin, petioled, the blades 1-4 mm. long, glabrous or with a few long hairs, obtuse or acutish at the apex, contracted into slender petioles of about the same length; stipules minute or obsolete; peduncles solitary in the axils, filiform, 2-3 times as long as the leaves; calyx scarcely 1 mm. long,

the lobes ovate to lanceolate bearing a few long hairs, much shorter than the tube; corolla white, funnelform, 1.5–2 mm. long, the 4 or 5 lobes shorter than the tube; capsule turbinate, about 2 mm. long.

Gregarious among stones, Government House yard, St. Croix prior to 1876 (according to Eggers):—Bahamas; Cuba; Hispaniola; Guadeloupe.

4. **Oldenlandia uniflora** L. Sp. Pl. 119. 1753.

Oldenlandia glomerata Michx. Fl. Bor. Am. 1: 83. 1803.

Hedyotis fasciculata Bertol. Mem. Acc. Bologna 2: 306. 1850.

Oldenlandia fasciculata Small, Fl. SE. U. S. 1106. 1903.

Annual, weak, usually tufted, more or less hirsute-pubescent, or glabrate, diffuse or ascending; stems 2.5–35 cm. long. Leaves short-petioled or sessile, mostly thin, entire, 3–5-nerved, ovate, oblong, or oval, acute or obtuse at the apex, narrowed at the base, 1–2.5 cm. long; flowers sessile or nearly so, white, about 2 mm. broad, terminal and axillary, clustered or solitary; calyx hirsute or glabrous, hemispheric in fruit, the ovate-lanceolate or oval lobes erect and nearly equalling the tube; corolla subrotate, shorter than the calyx-lobes, white; capsule subglobose, 1.5–2 mm. in diameter, hirsute or glabrous.

Moist sandy situations on the northern coastal plain of Porto Rico:—southeastern United States; Jamaica; Cuba. GRACIOSA.

2. **CLAVENNA** Neck. Elem. 2: 145. 1790.

Small, prostrate herbs, perennial by tuberous-thickened roots, with opposite petioled leaves and solitary peduncled axillary white flowers. Calyx-tube hemispheric, mostly 4-lobed, the lobes alternating with as many small teeth. Corolla funnelform-campanulate, usually with 4 obtuse lobes. Stamens 4, rarely 5, with short filaments and dorsifixed anthers. Ovary 2-celled; ovules few, style short, 2-cleft. Capsule one-fourth superior, hemispheric, loculicidally 2-valved. Seeds peltate, nearly smooth. [In honor of Jacob Antonio Clavenna, Italian naturalist of the 17th century.] A monotypic genus.

1. **Clavenna tetrandra** (L.) Standl. N. A. Fl. 32: 24. 1918.

Peplis tetrandra L. Amoen. Acad. 5: 413. 1760.

Hedyotis tuberosa Sw. Obs. 136. 1791.

Lucya tuberosa DC. Prodr. 4: 434. 1830.

Lucya tetrandra K. Schum. in E. & P. Nat. Pfl. 4¹: 27. 1891.

Dunalia tetrandra Kuntze, Rev. Gen. Pl. 281. 1891.

Prostrate; stems several, simple or little branched, 15 cm. long or less, puberulent when young. Leaves ovate or elliptic, 5–16 mm. long, 3–5-nerved, acute or obtuse, hispidulous or glabrate, the petiole 1–4 mm. long; stipules very short; pedicels filiform, 3–6 mm. long, deflexed or spreading in fruit; calyx hispidulous, about 1.5 mm. long; corolla a little longer than the calyx-teeth; capsule 3–4 mm. broad; seeds oval, black.

Wet shaded rocks at middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola.

3. **RONDELETIA** L. Sp. Pl. 172. 1753.

Shrubs or trees, with opposite or ternate leaves, the stipules interpetiolar, the flowers in terminal or axillary clusters, rarely solitary. Calyx-tube globose to oblong, the 4 or 5 lobes persistent. Corolla funnelform or salverform, white, yellow or red, with a slender tube and 4 or 5 spreading imbricated lobes. Stamens

4 or 5, borne on the throat of the corolla; filaments short; anthers erect, dorsifixed. Disk annular. Ovary 2-celled; ovules numerous, style filiform. Capsule 2-grooved, 2-celled, 2-valved, usually many-seeded. Seeds minute, often winged or appendaged. [Commemorates G. Rondelet, 1507–1566, professor in Montpellier.] About 75 species, natives of tropical America. Type species: *Rondeletia americana* L.

Calyx-lobes much shorter than the tube; tree.

1. *R. portoricensis*.

Calyx lobes as long as the tube or longer; shrubs or small trees.

2. *R. pilosa*.

Calyx-lobes much longer than the tube; pubescence pilose.

3. *R. inermis*.

Calyx-lobes about as long as the tube; pubescence appressed.

1. ***Rondeletia portoricensis*** Krug & Urban; Urban, Symb. Ant. 1: 414. 1899.

A forest tree, up to 20 m. high, the stout twigs tomentulose when young. Stipules tubular, rigid, 5–7 mm. long, the lobes deltoid, white-silky within. Leaves oval to oblong-elliptic, coriaceous, 8–20 cm. long, glabrous and dark green above, strigillose on the veins beneath, the apex rounded or obtuse, the base narrowed, the stout petioles 1–2.5 cm. long; panicles axillary, 3–7 cm. long; pedicels stout, 3–6 mm. long; calyx-tube white-strigillose, the 5 lobes minute, deltoid; corolla white, appressed-pilose, 7–8 mm. long, its lobes rounded; capsule subglobose, 5–7 mm. broad, tomentulose; seeds flat, broadly winged.

Mountain forests at middle and higher elevations. Porto Rico. Endemic.

2. ***Rondeletia pilosa*** Sw. Prodr. 41. 1788.

Rondeletia triflora Vahl, Symb. 3: 34. 1794.

Oldenlandia longiflora Lam. Encycl. 4: 534. 1797.

Hedyotis longiflora Spreng. Pug. 2: 27. 1815.

A shrub or small tree, 4 m. high or less, the stout twigs densely pilose. Stipules 5–9 mm. long, thin, sheathing, the deltoid lobes silky; leaves elliptic or elliptic-ovate, subcoriaceous, 4–10 cm. long, appressed-pubescent above, densely pilose beneath, the apex acute or acuminate, the base acute to subcordate, the petioles 2–6 mm. long; inflorescence axillary, about 3-flowered, the peduncles 1.5–7 cm. long, the pedicels slender; calyx-tube long-pilose, the 4 linear lobes 6–12 mm. long; corolla retrorsely pilose, its tube about 14 mm. long, its 4 rounded lobes 3 mm. long; capsule globose, 4–5 mm. in diameter, pilose. [*Hedyotis villosa* of Sessé & Mocino, not of Wight & Arnott.]

Hillsides and thickets near the coast, eastern and southeastern districts of Porto Rico; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda; recorded from Montserrat.

3. ***Rondeletia inermis*** (Spreng.) Krug & Urban; Urban, Symb. Ant. 1: 416. 1899.

Catesbaea inermis Spreng. Syst. 1: 416. 1825.

Rondeletia inermis angustifolia Krug & Urban; Urban, loc. cit. 1899.

Rondeletia inermis oblongifolia Krug. & Urban; Urban, loc. cit. 1899.

Rondeletia inermis intermedia Krug. & Urban; Urban, loc. cit. 1899.

Rondeletia inermis latifolia Krug & Urban; Urban, loc. cit. 1899.

A shrub, 1–3 m. high, or sometimes a small tree 4 or 5 m. high, the twigs strigose or glabrous. Stipules deltoid, about 2 mm. long, acute or acuminate. Leaves various, linear to oblong, elliptic or obovate, chartaceous or subcoriaceous, 1–10 cm. long, 0.5–5 cm. wide, reticulate-veined, puberulent, more or less pilose or glabrate, short-petioled, the apex acute, apiculate, obtuse or rounded, the base narrowed; inflorescence axillary, peduncled, 1–5-flowered; peduncles slender, 0.5–3 cm. long; pedicels 1–5 mm. long; calyx tomentose or strigose, its usually 4 lobes oblong to obovate, acute or obtuse, 1.5–4 mm. long; corolla yellow or

nearly white to purple, or yellow changing to purple, 7–12 mm. long, its tube densely whitish-pilose, its usually 4 lobes rounded; capsule globose, tomentulose, 3–4 mm. in diameter. [*R. arborescens* of Stahl and of Millspaugh, not of Grisebach; *R. laevigata* of Bello; *R. tetrandra* Sessé & Mocino, not Roxb.]

Thickets and hillsides in nearly all parts of Porto Rico at lower and middle elevations in both dry and wet districts, consisting of several races different in size and shape of the leaves and in pubescence; the narrow-leaved races inhabit, for the most part, the southern dry districts and are mostly more pubescent than the broad-leaved ones which are mainly found in wet or moist districts; the extreme forms appear very different but the races seem to be connected by intermediate types; Muertos. Endemic. CORDOBANCILLO.

Rondeletia odorata Jacq., Cuban, seen in a garden at St. Thomas in 1925, is a shrub, with strigose-hirsute twigs, nearly sessile ovate to oblong leaves 2–5 cm. long, the orange-red flowers corymbose-paniculate, the corolla-limb 10–12 mm. broad.

4. **HILLIA** Jacq. Enum. 3. 1760.

Epiphytic shrubs, glabrous throughout, with fleshy opposite petioled leaves and large white solitary terminal, nearly sessile flowers, the intrapetiolar stipules caducous. Calyx-tube mostly cylindric, the 2–6 lobes linear or foliaceous, caducous. Corolla salverform, the tube long, the throat somewhat expanded, the 3–7 lobes spreading, contorted. Stamens 3–7, borne below the throat of the corolla, their filaments short, their anthers linear. Ovary 2-celled; style filiform, clavate above, 2-lobed; ovules many. Capsule oblong or cylindric, 2-celled, 2-valved. Seeds very small, the apex bearing a tuft of hairs, the base appendaged [Commemorates John Hill, 1716–1775, eminent English botanist.] A few species, native of tropical America, the following typical.

1. **Hillia parasitica** Jacq. Enum. 18. 1760.

Hillia longiflora Sw. Prodr. 58. 1788.

Somewhat fleshy, the branches often elongated and pendent, up to 2 m. long, rather stout. Stipules oblong, thin, 2.5 cm. long or less, obtuse; leaves oval to obovate, various, rounded, obtuse or acute, 5–15 cm. long, shining above, the lateral veins obscure, the petioles stout, 2.5 cm. long or less; bracts large, stipule-like: calyx-tube cylindric, 3–5 mm. long, the 6 linear lobes about as long; corolla 6–10 cm. long, its tube about 4 mm. thick, the usually 6, lanceolate lobes 2–4 cm. long; capsule brown, cylindric, 6–12 cm. long; coma of the seeds brownish yellow, 8–12 mm. long.

On trees in mountain forests, Porto Rico, ascending to higher elevations:—Jamaica; Cuba; Hispaniola; Saba to Trinidad; continental tropical America.

5. **EXOSTEMA** L. C. Rich; H. & B. Pl. Aequin. 1: 131. 1807.

Shrubs or trees, with opposite petioled leaves, deciduous stipules, and solitary or paniced flowers. Calyx-tube cylindric to turbinate, with 5 linear lobes. Corolla salverform, the slender tube elongated, the limb with 5 long imbricated lobes. Stamens 5, borne near the base of the corolla; filaments filiform, long; anthers narrowly linear, basifixed, exserted. Ovary 2-celled; style filiform, exserted; ovules numerous in each cavity. Fruit a 2-valved capsule, many-seeded; seeds broadly winged. [Greek, exserted stamens.] Thirty species or more, natives of tropical America. Type species: *Exostema parviflorum* A. Rich.

Flowers corymbose-paniculate; leaves 10–22 cm. long.
Flowers solitary in the axils; leaves 3–8 cm. long.

1. *E. sanctae-luciae*.
2. *E. caribaeum*.

1. **Exotsema sanctae-luciae** (Kentish) Britten, Journ. Bot. **53**: 138. 1915.

Cinchona sanctae-luciae Kentish, New Species of Bark 52. 1784.

Cinchona floribunda Sw. Prodr. 41. 1788.

Exostema floribundum R. & S. Syst. **5**: 19. 1819.

A tree, the twigs glabrous. Leaves chartaceous, oblong to elliptic, 10–22 cm. long, about half as wide as long, short acuminate, glabrous and shining above, dull and with tufts of hairs in the axils of the veins beneath, the stout petioles 12 mm. long or less; stipules thin, 6–9 mm. long; flowers corymbose-paniculate at the ends of twigs, the clusters up to 15 cm. broad; pedicels 5–12 mm. long; calyx-tube 6–7 mm. long, the lobes triangular-subulate, 1–2 mm. long; corolla red, its tube 2–3 cm. long, the linear obtuse lobes about as long; anthers exserted; capsule cylindric, 1–2 cm. long, faintly ribbed.

Forest on Monte Alegrillo, near Maricao, collected only by Sintenis:—Cuba; Hispaniola; Guadeloupe and Dominica to St. Vincent. Recorded from Trinidad.

2. **Exostema caribaeum** (Jacq.) R. & S. Syst. **5**: 18. 1819.

Cinchona caribaea Jacq. Enum. 16. 1760.

A glabrous shrub or small tree up to 8 m. high, with a trunk sometimes 1 dm. in diameter, the bark bitter, narrowly ridged and fissured. Leaves oblong-lanceolate to elliptic, rather thin, 3–8 cm. long, 1–3 cm. wide, acuminate or acute at the apex, narrowed at the base, the midvein prominent, the few lateral veins obscure, the slender petioles about one-fourth as long as the blades; stipules broadly ovate, acuminate, about 1.5 mm. long; flowers solitary in the axils; peduncles slender, about as long as the calyx; calyx clavate-cylindric, 4–5 mm. long, its teeth short; corolla white or purplish, its tube 2–3 cm. long, slightly longer than the lobes; anthers long-exserted; capsule oblong, smooth, woody, 10–15 mm. long.

Woodlands and thickets at lower and middle elevations in dry parts of the southern districts of Porto Rico; Mona; Culebra; Vieques; Muertos; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda; Anegada:—Florida; Bahamas; Jamaica; Cuba; Hispaniola; St. Martin to Grenada; Central America and northern South America. Its wood is brown, strong and hard, with specific gravity about 0.93. The bark has been used as a febrifuge. CUERO DE SAPO. PRINCE-WOOD. YELLOW TORCH.

6. **URCEOLARIA** Willd.; Gmelin, Syst. **2**: 390. 1791.

Somewhat fleshy, usually epiphytic, glabrous shrubs or woody vines, with opposite petioled coriaceous leaves, large interpetiolar stipules, the flowers in terminal dense involucrate peduncled heads. Calyx with a turbinate or hemispheric tube and a short truncate persistent limb. Corolla salverform or funnel-form, with 5–10 narrow valvate lobes. Stamens 5–10, borne on the corollathroat, the filaments short, the anthers linear. Ovary 2–4-celled; ovules numerous style elongated, 2–4-cleft. Fruit baccate, 2–4-celled. Seeds very small, suborbicular. [Greek, a small pitcher.] About 8 species, natives of the West Indies and northern South America, the following typical.

1. **Urceolaria exotica** Gmelin, Syst. **2**: 390. 1791.

Schradera capitata Vahl, Eclog. **1**: 35. 1796.

Urceolaria capitata Fritsch, Oest. Bot. Zeit. **44**: 288. 1894.

Branches stout, vine-like, yellowish, 2–12 m. long. Stipules obovate, rounded, 1–1.5 cm. long; leaves oval or oblong, 10 cm. long or less, 2–5.5 cm. wide, obtuse or rounded at both ends, shining above, the lateral venation in-

conspicuous, the stout petioles 1–2 cm. long; peduncles 2–4 cm. long, stout; heads subglobose, 3–4 cm. in diameter, the involucre about 1 cm. long; flowers white; calyx about 1 cm. long; corolla-tube 7–15 mm. long, the 5–7 acutish lobes longer or shorter; anthers about 5 mm. long; style 2-cleft.

On trees in wet forests, Porto Rico, ascending to higher elevations:—Cuba; Hispaniola; St. Kitts to St. Vincent; Brazil.

7. **DUGGENA** West, Bidr. St. Croix 269. 1793.

More or less pubescent shrubs or small trees, with opposite petioled leaves, interpetiolar stipules, and small flowers in terminal spikes, racemes or narrow panicles. Calyx-tube globose to campanulate, the usually 4 lobes persistent. Corolla salverform, villous or pilose, usually 4-lobed, the lobes obtuse, spreading. Stamens 4, rarely 5, borne on the corolla-tube, the filaments short. Ovary 2-celled or 4-celled; style filiform, 2-cleft or 4-cleft; ovules many. Fruit berry-like, globose, 2-sulcate or 4-sulcate, 2-coccos or 4-coccos. [Named for Duggen.] About 20 species, the following typical.

1. **Duggena hirsuta** (Jacq.) Britton.

- Justica hirsuta* Jacq. Enum. 11. 1760.
Barleria hirsuta Jacq. Obs. 2: 7. 1767.
Lygistum spicatum Lam. Tabl. Encycl. 1: 286. 1791.
Duggena Richardii West, Bidr. St. Croix 269. 1793.
Coccocypselum spicatum H.B.K. Nov. Gen. 3: 406. 1820.
Hedyotis secunda Spreng.; Schultes, Mant. 3: 133. 1827.
Gonzalagunia Coccocypselum C. & S. Linnaea 4: 196. 1829.
Gonzalea spicata DC. Prodr. 4: 437. 1830.
Gonzalagunia hirsuta Schum. in Mart. Fl. Bras. 6⁶: 291. 1889.
Gonzalagunia spicata Maza, Anal. Soc. Esp. Hist. Nat. 23: 289. 1895.
Duggena spicata Standley, Contr. U. S. Nat. Herb. 18: 126. 1916.

A shrub, 3 m. high or less, rarely a tree up to 4 m. high, the long, slender branches silky strigose, at least when young. Stipules triangular-subulate, 4–12 mm. long; leaves ovate, oblong or lanceolate, membranous, pubescent or glabrate, 6–18 cm. long, the apex acuminate, the base acute or rounded, the slender petioles 2.5 cm. long or less; inflorescence spiciform-paniculate, 1–4 dm. long; calyx appressed-pilose, its tube about 2 mm. long, its 4 lobes linear to oblong, about as long; corolla 10–15 mm. long, white, the 4 lobes about half as long as the tube; stamens 4; style 2-cleft; fruit white or blue, dicoccos, 3–4 mm. in diameter. [*Gonzalea panamensis* of Krebs.]

Woodlands and thickets, Porto Rico, in wet or moist districts, ascending to higher elevations; St. Thomas; St. Jan; Tortola:—Hispaniola; Saba to Trinidad and northern South America. RABO DE RATON. MATA DE MARIPOSA. YERBA PELADA.

8. **TONTANEA** Aubl. Pl. Guian. 1: 108. 1775.

Prostrate herbs, with opposite petioled leaves, small stipules, and blue or purplish flowers in axillary heads. Calyx ovoid or turbinate, 4-lobed, the lobes persistent. Corolla funnelform, 4-lobed, the lobes valvate. Stamens 4, borne on the corolla-tube; filaments short; anthers narrow with a 2-lobed base. Ovary 2-celled; style slender, 2-cleft; ovules many. Fruit a blue berry containing many orbicular seeds. [Guiana name.] About 12 species, natives of tropical America. Type species: *Tontanea guianensis* Aubl.

1. **Tontanea herbacea** (Lam.) Standley, N. A. Fl. 32: 147. 1921.*Coccosipsilum repens* Sw. Prodr. 31. 1788.*Coccocipsilum herbaceum* Lam. Encycl. 2: 56. 1786.

Stems up to 8 dm. long, densely pilose when young. Stipules linear-subulate, 6 mm. long or less; leaves slender-petioled, ovate to oblong, 1.5–5 cm. long, pilose, the apex obtuse or acute, the base mostly rounded, the petioles pilose; heads sessile or short-stalked, few-flowered; bracts subulate, 3–4 mm. long; calyx pilose, its lobes linear, 2–3 mm. long, about twice as long as the tube; corolla blue, about 6 mm. long, its oblong lobes about half as long as the tube; berries blue, short-pilose, 5–6 mm. in diameter.

Woodlands and thickets, Porto Rico, at lower and middle elevations in moist districts:—Jamaica; Cuba; Hispaniola; Guatemala to Colombia. YERBA DE GUAVA. BAL-SAMILLO.

9. **SABICEA** Aubl. Pl. Guian. 1: 192. 1775.

Woody vines, or shrubs, rarely trees, with opposite or sometimes verticillate leaves, persistent intrapetiolar stipules, and small bracted clustered axillary flowers. Calyx 4–5-lobed, the tube subglobose, the lobes persistent. Corolla funnelform or salverform, 4–5-lobed, the lobes valvate. Stamens 4 or 5, borne on the tube or the throat of the corolla; anthers linear, included. Ovary mostly 4–5-celled; style 2–5-branched; ovules many. Fruit a berry. Seeds very small. [Guiana name.] Perhaps 30 species, natives of tropical America. Type species: *Sabicea cinerea* Aubl.

1. **Sabicea hirsuta** H.B.K. Nov. Gen. 3: 417. 1820.

A woody vine, up to 5 m. long or longer, the branches densely hirsute or pilose. Stipules ovate, 10 mm. long or less, reflexed; leaves ovate to oblong, 5–12 cm. long, hirsute, or glabrate with strigose veins, the apex acuminate or acute, the base obtuse or rounded, the petioles 7–16 cm. long; flowers few together and sessile in the axils; calyx hirsute, its narrowly lanceolate lobes 2–4 mm. long; corolla white, strigose, its tube about 6 mm. long, its lobes about 2 mm. long; fruit purplish, about 10 mm. in diameter. [Recorded from Porto Rico by de Candolle as *S. hirta* Sw., a Jamaica species.]

Woods and thickets in moist or wet districts, Porto Rico, ascending to higher elevations:—Trinidad; continental tropical America.

Sabicea cinerea Aubl., recorded by Wernham as collected in Porto Rico by Ledru, differs from *S. hirsuta* by having arachnoid-tomentose stems and leaves, and flowers about twice as large. It is native in French and British Guiana; we suspect the Porto Rico record to be erroneous.

10. **RANDIA** L. Sp. Pl. 1192. 1753.

Evergreen, often spiny shrubs or trees, with opposite leaves and perfect solitary, usually axillary flowers. Corolla funnelform, salverform or campanulate, its lobes 5, convolute. Stamens 5, adnate to the throat of the corolla; filaments short or nearly wanting. Disk annular or cushion-like. Ovary 2-celled or very rarely 3–4-celled; ovules several or many in each cavity; styles usually united, stout, terminating in a club-shaped, spindle-shaped or rarely cleft stigma. Berry usually 2-celled. Seeds free or in a pulp; testa thin, the endosperm horny. [In honor of Isaac Rand, English-apothecary.] About 100 species, natives of tropical regions. Type species: *Randia mitis* L.

Spiny shrubs or trees; corolla small (unknown in No. 2).

Berry white, smooth.

Fruit gray, roughened.

Unarmed shrub or tree; corolla 5-7 cm. long.

1. *R. mitis*.

2. *R. portoricensis*.

3. *R. formosa*.

1. ***Randia mitis*** L. Sp. Pl. 1192. 1753.

Randia aculeata L. Sp. Pl. 1192. 1753.

Gardenia Randia Sw. Prodr. 52. 1788.

Randia latifolia Lam. Encycl. 3: 24. 1789.

Randia aculeata mitis Eggers, Bull. U. S. Nat. Mus. 13: 60. 1879.

A virgate branching shrub, 1-3 m. tall, or a small tree up to 10 m. high, usually spiny, the foliage glabrous or nearly so. Leaves often clustered, spatulate, obovate, elliptic, oval or suborbicular, 1-5 cm. long, narrowed into short petioles; flowers axillary, short-stalked; calyx-lobes triangular or ovate; corolla white, 6-8 mm. long, its lobes oblong, shorter than the tube; berries subglobose or oval, white, 6-8 mm. long.

Thickets and hillsides, at lower and middle elevations, mostly in dry districts, Porto Rico; Icacos; Mona; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Anegada:—Florida, Bermuda; West Indies to Trinidad and Curacao; Mexico (?). The brown wood is hard, strong, heavy and durable. ESCAMBRON. TINTELLO. PALO DE COTORRA. BOX BRIER, DOGWOOD. CABAI NAGTE. CHRISTMAS TREE. INK BERRY.

2. ***Randia portoricensis*** (Urban) Britton and Standley.

Basanacantha portoricensis Urban, Symb. Ant. 5: 507. 1908.

A shrub about 1 m. high, the short stiff twigs minutely pilose, terminating in 3 spines 7-15 mm. long. Stipules triangular, acuminate, very small; leaves nearly sessile, obovate or subrhombic, 8 mm. long or less, short-pilose on both sides, obtuse and apiculate at the apex, narrowed at the base, few-veined, flat-margined, subcoriaceous; fruit borne at the end of the twigs, sessile, globose, about 1.5 cm. in diameter, gray, somewhat roughened by large lenticels, tipped by the base of the calyx; seeds about 6 mm. long, flattened, ovate. [*Randia Sagraeana* of Cook & Collins, not Griseb.]

Thickets and hills Ponce and Guanica, Porto Rico. Endemic.

3. ***Randia formosa*** (Jacq.) Schum. in Mart. Fl. Bras. 6^e: 342. 1889.

Musaenda formosa Jacq. Enum. 16. 1760.

Randia Mussaendae DC. Prodr. 4: 388. 1830.

Gardenia armata Sw. Prodr. 51. 1788.

An unarmed shrub or small tree, the slender young twigs loosely pilose. Stipules ovate, short, acute; leaves thin, elliptic, 2-9 cm. long, glabrous above, sparingly pubescent beneath, short-petioled, the apex acute or obtuse, the base narrowed; flowers large, white, solitary at the end of short twigs; calyx strigose, its subulate lobes about 5 mm. long; corolla-tube cylindric, appressed-pubescent, 5-7 cm. long, its spreading lobes ovate, acute, 2-2.5 cm. long; berry subglobose or ellipsoid, smooth, greenish white, 1.5-2.5 cm. long.

Roadsides, St. Croix, escaped from cultivation; planted for ornament in Porto Rico and the Virgin Islands:—St. Vincent; Tobago; Trinidad; northern South America. JASMIN DE ROSA.

11. **GARDENIA** Ellis, Phil. Trans. 51: 935. 1761.

Shrubs, rarely trees, with opposite or ternate leaves, and large axillary or terminal flowers. Calyx-limb usually persistent. Corolla salverform to campanulate, the tube usually long, the limb 5-9-lobed. Stamens 5-9, borne on the corolla-throat; filaments very short, or wanting. Anthers linear. Ovary 1-

celled or imperfectly 2-celled; ovules many; style thick, entire or 2-lobed. Fruit coriaceous or fleshy, irregularly bursting, the seeds horizontal. [Commemorates Alexander Garden, 1730–1791, physician and botanist of Charleston, South Carolina.] Sixty species or more, natives of the Old World tropics, the following typical.

1. **Gardenia jasminoides** Ellis, Phil. Trans. 51: 935. 1761.

Gardenia florida L. Sp. Pl. ed. 2, 305. 1762.

A glabrous branching shrub, 0.5–2 m. high, the lower branches sometimes rooting. Leaves oblong to elliptic or obovate, subcoriaceous, 5–15 cm. long, short-petioled, acuminate or acute, the base narrowed; flowers solitary or few together, axillary or terminal, short-peduncled, fragrant; calyx-tube obconic, 1–2 cm. long, the narrowly linear lobes about twice as long; corolla white, its cylindric tube about as long as the calyx-lobes, or shorter, its lobes obovate, 2–3 cm. long; capsule oblong, ribbed, 1.5–2.5 cm. long.

Occasionally escaped from cultivation in Porto Rico mountain gardens; commonly planted for ornament and for its fragrant, often double flowers in Porto Rico and the Virgin Islands. Native of China. Baron Eggers inadvertently recorded this as *Tabernaemontana capensis*. JASMIN. TULIPA. CAPE JESSAMINE.

Gardenia latifolia Ait., an East Indian species, was listed by Krebs from St. Thomas in 1851, perhaps in cultivation.

12. **GENIPA** L. Syst. ed. 10, 931. 1759.

Trees, with large opposite leaves, intrapetiolar stipules, and large white or yellowish cymose flowers. Calyx-tube turbinate or campanulate, the persistent limb truncate or lobed. Corolla salverform, the limb with 5 or 6 spreading contorted lobes. Stamens 5 or 6, borne near the top of the corolla-tube, the anthers sessile. Ovary 1-celled or 2-celled; ovules many; style short; stigma fusiform. Fruit subglobose, baccate. Seeds compressed, large, the testa fibrous. [Brazilian name.] A few species of tropical America, the following typical.

1. **Genipa americana** L. Syst. ed. 10, 931. 1759.

A tree, 6–14 m. high, the twigs stout, pilose or glabrous. Stipules acuminate, glabrous, 8–12 mm. long; leaves obovate to oblong, glabrous or pubescent, subcoriaceous, 1–3.5 dm. long, the apex acute, obtuse or short-acuminate, the base narrowed, the stout petioles 1 cm. long or less; cymes short-peduncled; pedicels 4–10 mm. long; calyx glabrous or pilose, the tube 6–8 mm. long, about as long as the nearly truncate limb; corolla-tube 2–3 cm. long, the lobes obtuse, silky, as long as the tube; fruit 6–7 cm. in diameter.

Woods and forests, Porto Rico, in wet or moist regions, ascending to higher elevations; Vieques; St. Thomas; St. Jan.—Cuba; Hispaniola; Guadeloupe to Trinidad; continental tropical America. The wood, used for boxes, hoops, and in construction, is strong, tough and elastic, with specific gravity about 0.85. JAGUA. GENIPA.

13. **HAMELIA** Jacq. Enum. 2, 16. 1760.

Shrubs, or small trees, with opposite or verticillate, petioled leaves, narrow deciduous stipules, and red or yellow flowers secund on the branches of terminal compound cymes. Calyx-tube ovoid to turbinate, its 5 short lobes persistent. Corolla tubular, or narrowly campanulate, constricted at the base, the limb 5-lobed, the lobes short, imbricated. Stamens 5, borne near the base of the corolla;

filaments short; anthers basifixed, linear, scarcely exerted, or included, the connective appendaged. Ovary 5-celled; style filiform; stigma narrowly fusiform; ovules numerous. Berry small, ovoid, 5-lobed, 5-celled. Seeds very small, angled. [In honor of H. L. Du Hamel de Monceau, 1700–1782, French botanist.] About 25 species of tropical and subtropical America; known as *BALSAMO*. Type species: *Hamelia erecta* Jacq.

Corolla crimson to orange, nearly tubular; leaves puberulent or pubescent beneath, acute or short-acuminate.
Corolla yellow, funnelform-campanulate, leaves glabrous or nearly so, sharply acuminate.

1. *H. erecta*.

2. *H. axillaris*.

1. ***Hamelia erecta*** Jacq. Enum. 16. 1760.

Hamelia patens Jacq. Enum. 16. 1760.

A shrub, or small tree up to about 7 m. high, with slender branches, the twigs, leaves and inflorescence pubescent or puberulent. Leaves opposite, or verticillate in 3's to 5's, thin, elliptic to ovate-elliptic, 5–15 cm. long, acute or acuminate, mostly narrowed at the base, the slender petioles one-fourth to one-half as long as the blades; stipules lance-subulate, 2–3 mm. long; cymes 3–5-rayed; flowers numerous, very short-pedicelled; corolla crimson to scarlet, or orange, tubular, 12–20 mm. long, its lobes very short; berry dark red or purple, 5–6 mm. long, a little produced beyond the calyx.

Woods, hillsides and thickets at lower and middle elevations, Porto Rico, mostly in moist districts; St. Croix; St. Thomas (according to Eggers):—Florida; West Indies; tropical continental America. Plants with densely pubescent foliage occur in the dry southwestern parts of Porto Rico.

2. ***Hamelia axillaris*** Sw. Prodr. 46. 1788.

Hamelia lutea de Rohr; Smith in Rees' Cyclop. 17: No. 4. 1811.

Hamelia declinata Sessé & Mocino, Fl. Mex. ed. 2, 60. 1894.

A shrub, often much branched and straggling, about 2 m. high, or lower, glabrous, or the young twigs and leaves puberulent, the branches slender. Leaves opposite, slender-petioled, nearly membranous, ovate to elliptic, 5–10 cm. long, acuminate, the base narrowed; stipules narrowly lanceolate, about 3 mm. long; cymes short-peduncled, several-many-flowered; flowers nearly sessile; corolla funnelform-campanulate, yellow, about 12 mm. long, its lobes much shorter than the tube; berry ellipsoid to subglobose, black, about 8 mm. long.

Wet woods, forests and ravines, Porto Rico, ascending to higher elevations, St. Croix; St. Thomas:—Jamaica; Cuba; Hispaniola; Saba; St. Kitts; Trinidad; continental tropical America. *BALSAMILLO*.

14. ***CATESBAEA*** L. Sp. Pl. 109. 1753.

Spinescent shrubs or small trees, with terete twigs and small glabrous, often fascicled leaves, the small stipules deciduous. Flowers white, solitary and short-peduncled or sessile in the axils. Calyx sub-campanulate, with 4 narrow persistent teeth. Corolla funnelform or campanulate, its 4 lobes valvate. Stamens 4, borne near the base of the corolla. Ovary 2-celled; stigma 2-lobed. Ovules several or many. Fruit a berry. Seeds with fleshy endosperm. [In honor of Mark Catesby, 1679–1749, traveller and naturalist.] About 8 species, natives of Florida and the West Indies. Type species: *Catesbaea spinosa* L.

Fruit black, 5–6 mm. in diameter.
Fruit white, 2–4 mm. in diameter.

1. *C. melanocarpa*.
2. *C. parviflora*.

1. *Catesbaea melanocarpa* Krug & Urban; Urban, Symb. Ant. 1: 427. 1899.

A branching shrub 1–3 m. high, the slender twigs short-pilose when young, becoming glabrous. Spines acicular, borne at every internode, 1–2 cm. long; leaves obovate or suborbicular, 5–15 mm. long, the apex rounded or acute, the base narrowed or cuneate, the petioles very short; flowers subsessile; calyx-teeth linear-lanceolate; corolla about 8 mm. long; berry globose, black, 5–6 mm. in diameter. [*C. parviflora* of Vahl and of Eggers, not of Swartz; *Scolosanthus versicolor* of Bello, not of Vahl.]

Thickets and hillsides, vicinity of Guanica and Montalva, Porto Rico; Fair Plain; St. Croix (according to Eggers):—Antigua; Guadeloupe.

2. *Catesbaea parviflora* Sw. Prodr. 30. 1788.

A much-branched shrub, 2 m. high or less, the branches long and slender, usually copiously armed with slender spines 5–20 mm. long, rather densely leafy. Leaves coriaceous, obovate to suborbicular or oblanceolate, 3–10 mm. long, rounded at the apex, narrowed at the base into short petioles; flowers sessile or nearly so; calyx-teeth subulate; corolla about 6 mm. long, its lobes obtuse; berry globose or ovoid, white, 2–4 mm. in diameter.

Limestone hills near the coasts, southern districts from Ponce to Guanica, Porto Rico:—Florida; Bahamas; Jamaica; Cuba.

15. *GUETTARDA* L. Sp. Pl. 991. 1753.

Trees or shrubs, with opposite leaves and deciduous stipules, the axillary, cymose, or sometimes solitary flowers, perfect or polygamo-dioecious. Calyx with an ovoid or globose tube, the limb tubular, mostly truncate or irregularly toothed. Corolla salverform, the tube elongated, sometimes curved, the limb with 4–9, obtuse imbricated lobes. Stamens as many as the corolla-lobes, borne on the corolla-tube; filaments very short or none; anthers linear. Ovary 4–9-celled; ovules 1 in each cavity, pendulous; style filiform; stigma capitate or 2-lobed. Fruit drupaceous. [In honor of Jean Etienne Guettard, 1715–1786, French botanist.] Sixty species or more, mostly of tropical America. Type species: *Guettarda speciosa* L.

Leaves obtuse or acute, not spinulose-tipped.

Leaves scabrous above.

Leaves smooth above.

Corolla-tube 12–15 mm. long.

Leaves densely pubescent and strongly reticulate-veined beneath.

Leaves nearly glabrous.

Leaves chartaceous, reticulate-veined; petioles and peduncles pubescent.

Leaves subcoriaceous, scarcely reticulate-veined; petioles and peduncles glabrous or puberulent.

Corolla-tube 6–10 mm. long.

Leaves shining above, glabrous or sparingly pubescent; corolla-limb 5–6-lobed.

Leaves dull, appressed-pubescent beneath; corolla-limb 4-lobed.

Leaves spinulose-tipped, 3 cm. long or less.

1. *G. scabra*.

2. *G. Krugii*.

3. *G. ovalifolia*.

4. *G. laevis*.

5. *G. parviflora*.

6. *G. elliptica*.

7. *G. pungens*.

1. *Guettarda scabra* (L.) Lam. Tabl. Encycl. 2: 218. 1819.

Matthiola scabra L. Sp. Pl. 1192. 1753.

Guettarda rugosa Sw. Prodr. 59. 1788.

A shrub or tree up to 10 m. high, the young twigs villous-tomentose. Leaves elliptic to ovate or obovate, coriaceous, 3–15 cm. long, obtuse or short-pointed and mucronate at the apex, subcordate or obtuse at the base, usually very rough

(rarely becoming smooth) above, densely reticulate-veined and finely pubescent beneath, the stout pubescent petioles 0.5–2 cm. long; stipules triangular-lanceolate, acute, 2–3 mm. long; peduncles few-flowered, 2–10 cm. long; calyx finely pubescent, about 3 mm. long; corolla 1.5–2 cm. long, appressed-pubescent, white, its oblong lobes much shorter than the tube; drupe globose, red, finely pubescent, 4–6 mm. in diameter, the calyx-limb at length wholly deciduous; flowers fragrant.

Woods, thickets and hillsides, Porto Rico, at lower and middle elevations; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda;—Florida; Bahamas; Cuba; Hispaniola; Anguilla; Grenada; Trinidad and Margarita; Central America. Recorded from Jamaica. Its wood is hard and dense, with a specific gravity of about 0.85. PALO DE CUCUBANO. VELVET-BERRY.

2. **Guettarda Krugii** Urban, Symb. Ant. 1: 431. 1899.

A shrub, 1–4 m. high, sometimes becoming a tree up to 10 m. high, the twigs stout, the young ones densely tomentulose, the older gray and glabrous. Stipules ovate, obtuse or acutish, brownish-villous, deciduous; leaves ovate to suborbicular or elliptic-obovate, coriaceous, or those of shoots subchartaceous, obtuse, rounded or acutish at the apex, rounded or cordate at the base, smooth and glabrous above, pubescent and reticulate-veined beneath, 3–11 cm. long, the villous and tomentulose petioles 6–15 mm. long; cymes 1–few-flowered in the upper axils; peduncles 1 cm. long or less; calyx brownish-villous, 5–6 mm. long, its limb irregularly subtruncate; corolla white, appressed-villous, about 1.5 cm. long, its lobes about one-fourth as long as the tube; fruit globose, densely tomentulose, 9–20 mm. in diameter.

Woods, hillsides and thickets at lower elevations near the coast, southwestern districts of Porto Rico:—Bahamas.

3. **Guettarda ovalifolia** Urban, Symb. Ant. 1: 432. 1899.

A tree, 5–10 m. high, the young twigs short-pilose. Stipules triangular, acuminate, densely pubescent, 3–4 mm. long; leaves broadly ovate to elliptic or obovate, chartaceous, 5–12 cm. long, strongly pinnately veined, reticulate-veined and glabrate above, short-pilose on the veins beneath, the apex rounded or obtuse, the base rounded or sometimes narrowed, the petioles 5–20 mm. long; peduncles slender, pubescent, shorter than the leaves, few-several-flowered; flowers sessile; calyx tomentulose, about 3.5 mm. long, its limb truncate; corolla white, densely retrorsely pubescent, about 15 mm. long, the nearly cylindric tube about twice as long as the 5 or 6 obovate lobes; ovary 4–6-celled; fruit oval to globose, tomentulose, 6–7 mm. long.

Woods and thickets, mostly at higher elevations, central and western districts of Porto Rico:—Hispaniola.

4. **Guettarda laevis** Urban, Symb. Ant. 1: 433. 1899.

A tree, up to 20 m. high, the twigs appressed-pubescent when young, soon glabrous. Stipules triangular-lanceolate, acuminate, 5–6 mm. long, densely puberulent; leaves broadly ovate to elliptic or obovate, subcoriaceous, 4–13 cm. long, strongly pinnately veined, minutely pubescent on the veins beneath, otherwise glabrous, the apex rounded, the base obtuse or narrowed, the stout petioles 8–20 mm. long; peduncles about as long as the leaves or somewhat longer, puberulent, cymosely few-several-flowered; flowers nearly sessile; calyx about 5 mm. long, puberulent, its limb truncate; corolla white, 12–14 mm. long, densely retrorsely pubescent, the nearly cylindric tube 2–3 times as long as the 5–7 obovate lobes; ovary 2–3-celled; fruit globose, 5–7 mm. in diameter.

Woods and thickets at higher elevations in the western mountains of Porto Rico. Endemic.

5. *Guettarda parviflora* Vahl, Eclog. 2: 26. 1798.*Guettarda parvifolia* Sw. Fl. Ind. Occ. 3: 1958. 1806.*Myginda Bredemeyeri* Schultes, Mant. 3: 349. 1827.

A tree, 6–10 m. high, or sometimes shrubby, the young twigs pubescent. Leaves oblong to elliptic or elliptic-obovate, 2–6 cm. long, shining above, glabrous or sparingly pubescent beneath, the apex acute or obtuse, the base narrowed or rounded, the petioles 2–4 mm. long; stipules short, ovate or ovate-lanceolate, pubescent; peduncles slender, mostly shorter than the leaves, 1–3-flowered; bracts about one-half as long as the calyx or shorter; calyx about 3 mm. long, its limb subtruncate; corolla whitish or yellow, puberulent, about 10 mm. long, its tube subclavate, about 3 times as long as the 5 or 6 lobes; fruit globose, black, finely puberulent, 5–6 mm. in diameter.

River-banks, thickets and hillsides at lower and middle elevations, southern districts of Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—St. Martin to Trinidad; northern South America. BLACK-BERRY.

6. *Guettarda elliptica* Sw. Prodr. 59. 1788.

A shrub, or a tree up to 8 m. high, with slender branches, the young twigs loosely pubescent. Leaves chartaceous, elliptic to ovate-elliptic or elliptic-lanceolate, 2–7 cm. long, obtuse, acutish or apiculate at the apex, narrowed, obtuse, or (on young shoots) rarely subcordate at the base, sparingly pubescent or glabrate above, finely appressed-silky beneath, the petioles 3–8 mm. long, or those of shoot-leaves longer; stipules lanceolate, 4–10 mm. long; peduncles slender, pubescent, shorter than the leaves, few-several-flowered; bracts lanceolate or oblong, shorter than the calyx; calyx about 2 mm. long, nearly truncate; corolla white or yellowish-white, about 6 mm. long, silky-pubescent, its 4 oblong lobes about one-fourth as long as the tube; fruit globose, red, turning black, 6–8 mm. in diameter, the calyx-limb at length deciduous.

Thickets and hillsides at low elevations southern and eastern districts of Porto Rico, mostly near the coast; Mona; Desecheo; Muertos; St. Thomas:—Florida; Bahamas; Jamaica; Cuba; Hispaniola.

7. *Guettarda pungens* Urban, Symb. Ant. 1: 434. 1899.

A virgate shrub, 2–3 m. high, with slender branches, the young twigs puberulent, soon glabrous. Leaves small, ovate to elliptic, glabrous when mature, 1–3 cm. long, rigid, coriaceous, the apex acute or acuminate, spinulose-tipped, the base obtuse or rounded, the petioles 1–4 mm. long; stipules triangular, acuminate, 2–3 mm. long; flowers solitary in the axils, short-peduncled; calyx-tube about 1.5 mm. long, the limb with 2 short blunt teeth; corolla 10–15 mm. long, its cylindric tube retrorsely pubescent, about 3 times as long as the 5 or 6 obovate lobes; ovary 4–5-celled; fruit globose, densely short-pilose, about 7 mm. in diameter.

Serpentine slopes, Monte Alegrillo, near Maricao, Porto Rico:—Hispaniola.

16. **STENOSTOMUM** Gaertn. f. Fr. & Sem. 3: 69. 1805.

Mostly glabrous shrubs or trees, with opposite leaves and small sessile or short-pedicelled flowers secund on the branches of peduncled cymes, the stipules distinct, deciduous. Calyx-tube mostly ovoid, its 4–5-toothed or nearly truncate limb persistent. Corolla salverform or funnellform, its 4 or 5 lobes imbricated. Stamens 4 or 5, borne on the throat of the corolla; filaments mostly short; anthers linear. Ovary 2–6-celled; ovules 1 in each cavity; style slender; stigma capitate or lobed. Fruit a small 2–6-celled drupe. [Greek, narrow mouth.] About 15 species, natives of the West Indies. Type species: *Laugeria lucida* Sw. The plants are known as QUINA or PALO DE QUINA in Porto Rico.

Calyx subtruncate, or with 4 or 5 short and broad teeth.

Leaves ovate to elliptic-obovate, mostly 2-3 times as long as wide.

Leaves subcoriaceous, dull; corolla 8-10 mm. long.

Leaves very short-petioled.

Leaves manifestly petioled.

Leaves thin, shining above; corolla 4-5 mm. long.

Leaves oblong to lanceolate, 3-5 times as long as wide.

Calyx-teeth subulate, as long as the tube.

1. *S. obtusifolium*.

2. *S. coriaceum*.

3. *S. lucidum*.

4. *S. Sintenisii*.

5. *S. acutatum*.

1. *Stenostomum obtusifolium* (Urban) Britton & Wilson.

Antirrhoea obtusifolia Urban, Symb. Ant. 1: 435. 1899.

A tree, 15 m. high, or lower, the twigs rather stout, glabrous. Leaves ovate, to elliptic or elliptic-obovate, subcoriaceous, 6-20 cm. long, pinnately veined, glabrous, dull, obtuse or bluntly short-acuminate, the base rounded, obtuse or subcordate, the stout petioles only 3-5 mm. long, or shorter; cyme-branches slender, several-many-flowered, 2-5 cm. long; flowers sessile; bractlets wanting; calyx about 1.5 mm. long, its 4 teeth short and broad; corolla greenish or purplish, about 10 mm. long, sparingly short-pilose, its rounded lobes about one-quarter as long as the tube; fruit narrowly oval, black, 10-13 mm. long, 2-celled.

Forests at middle and higher elevations in the eastern mountains of Porto Rico. The wood is reddish brown, hard, strong and heavy. Endemic. TORTUGUILLO.

2. *Stenostomum coriaceum* (Vahl) Griseb. Fl. Br. W. I. 334. 1861.

Laugeria coriacea Vahl, Eclog. 1: 26. 1796.

Guetarda coriacea Pers. Syn. 1: 201. 1805.

Stenostomum dichotomum DC. Prodr. 4: 461. 1830.

Petesia distachya Sessé & Moç. Fl. Mex. ed. 2, 19. 1894.

Antirrhoea coriacea Urban, Symb. Ant. 1: 436. 1899.

A tree, 8-20 m. high, the twigs and leaves glabrous. Stipules oblong, 5-8 mm. long; leaves elliptic or ovate, subcoriaceous, 5-13 cm. long, pinnately veined, obtuse or bluntly short-acuminate, the base obtuse or narrowed, the petioles about 1.5 cm. long or shorter; cymes slender-peduncled, few-branched, the branches 3-5 cm. long, several-many-flowered; flowers sessile, bractlets none; calyx about 1.5 mm. long, with 4 very short teeth; corolla white, 8-9 mm. long, its 4 rounded lobes much shorter than the slender tube; drupe oblong or ellipsoid, 8-12 mm. long, 2-celled, black. [*Exostema floribundum* of Bello, not of Roemer and Schultes.]

Woodlands, northern and northwestern districts of Porto Rico, at lower and middle elevations;—Jamaica; Montserrat; Guadeloupe; Dominica; Martinique; St. Vincent. The yellowish wood is heavy, hard and durable. QUINA. BOJE.

3. *Stenostomum lucidum* (Sw.) Gaertn. f. Fr. & Sem. 3: 69. 1805.

Laugeria lucida Sw. Prodr. 48. 1788.

Antirrhoea lucida Benth. & Hook. Gen. Pl. 2: 100. 1873.

A smooth-barked tree, 5-13 m. high, or often a shrub, with slender spreading glabrous gray branches. Leaves elliptic or oblong, chartaceous, glabrous, 4-10 cm. long, obtuse or acutish at the apex, obtuse or narrowed at the base, bright green, shining, pinnately veined, the petioles 4-10 mm. long; stipules narrowly lanceolate, puberulent, about 8 mm. long; inflorescence glabrous, shorter than or equalling the leaves, the branches of the cyme few, very slender; flowers sessile; calyx turbinate, 5-toothed, about 2.5 mm. long, the teeth rounded; corolla white, 4-5 mm. long, with 5 rounded lobes; drupe oblong, red to black, 5-7 mm. long, crowned by the calyx-limb.

Hillside, near Coamo Springs, 1913; Guayanilla, 1915; also recorded as Porto Rican by de Candolle and by Stahl;—Bahamas; Jamaica; Cuba to St. Thomas; recorded south to Trinidad.

4. *Stenostomum Sintenisii* (Urban) Britton & Wilson.*Antirrhoea Sintenisii* Urban, Symb. Ant. 1: 438. 1899.

A tree up to 15 m. in height, the slender twigs glabrous. Leaves oblong or oblong-lanceolate, coriaceous, glabrous, 5–12 cm. long, the midvein rather prominent, the lateral venation very obscure, the apex obtuse, rounded or acute, the base mostly narrowed, the petioles 4–10 mm. long, the upper surface shining; stipules ovate, 5–7 mm. long; cymes peduncled, several-flowered, their branches 1.5–3 cm. long; flowers sessile; bractlets none; calyx about 1.5 mm. long, its limb with 4 short obtuse teeth; corolla cream-colored, about 6 mm. long, pubescent, its slender tube much longer than the 4 obovate lobes; fruit ellipsoid, 8–10 mm. long.

Woods and thickets in wet districts of Porto Rico, at lower and middle elevations. The wood is yellowish. Endemic.

5. *Stenostomum acutatum* DC. Prodr. 4: 460. 1830.*Stenostomum viscosum* Griseb. Fl. Br. W. I. 334. 1861.*Antirrhoea acutata* Urban, Symb. Ant. 1: 439. 1899.(?) *A. acutata latifolia* Urban, loc. cit. 1899.

A somewhat viscid, branching shrub 0.4–3 m. high, or a small tree 4–8 m. high, the finely pubescent twigs slender, short. Leaves oblong or oblong-lanceolate, subcoriaceous, glabrous, 2–6 cm. long, reticulate-veined, the apex acute, obtuse or rounded, the base narrowed, the pubescent petioles 2–5 mm. long; stipules triangular, acute or acuminate about as long as the petioles or shorter; peduncles few-flowered, mostly shorter than the leaves; calyx 1.5–2 mm. long, its subulate teeth about as long as the tube; corolla white, 12–15 mm. long, its elliptic or obovate rounded lobes much shorter than the slender tube; fruit ellipsoid, about 5 mm. long, 4–6-celled.

Woods, cliffs and thickets near the coast, southwestern dry districts of Porto Rico; Mona; Vieques; Muertos:—Guadeloupe; Curaçao; Bonaire; Aruba. The variety *latifolia* was based on a barren specimen with leaves rounded or obtuse at both apex and base, collected by Sintenis near Guanica, Porto Rico; it is known to us only from the description.

A fruiting specimen of a tree about 4 m. high, collected at Cataño, Porto Rico, by Cook and Collins, Nov. 30, 1899 (No. 859) has leaves much like those of *S. obtusifolium* but with petioles up to 1 cm. long.

17. **LAUGERIA** Vahl, Eclog. 1: 26. 1796.

Resinous shrubs or small trees, with opposite coriaceous oblong or lanceolate leaves, sheathing connate stipules, and small bractless flowers, secund on the branches of axillary peduncled cymes. Calyx-tube short, the limb subtruncate. Corolla narrowly funnelform, its 4 or 5 lobes imbricated. Stamens 4 or 5, borne on the corolla-tube, the filaments filiform, the anthers linear. Ovary 4–5-celled, ovules 1 in each cavity; style rather thick; stigma subcapitate, 4–5-lobed. Fruit a small oblong drupe. [Commemorates Albert Laugier, Austrian botanist.] Two known species, the following typical, the other Bahamian and Cuban.

1. *Laugeria resinosa* Vahl, Eclog. 1: 27. 1796.*Stenostomum resinosum* Griseb. Fl. Br. W. I. 334. 1861.*Guettarda resinosa* Pers. Syn. 1: 201. 1805.*Antirrhoea resinosa* Cook & Collins, Contr. U. S. Nat. Herb. 8: 82. 1903.

A shrub, 2–8 m. high, or a small tree 4–7 m. high, the twigs, leaves and inflorescence resinous-viscid. Leaves oblong to oblong-lanceolate, 5–15 cm. long,

short-petioled, rather bluntly acuminate, the base narrowed, the lateral venation not prominent; stipular sheath 3–4 mm. long, truncate, ciliate, persistent; peduncles shorter than the leaves; cymes mostly 2-branched, the usually short branches few-flowered; calyx 1.5–2 mm. long; corolla about 6 mm. long its lobes much shorter than the tube; drupe black, 5–6 mm. long.

Woods and thickets in wet or moist parts of the central and western districts of Porto Rico, ascending to higher elevations:—Montserrat and Guadeloupe to St. Vincent. Recorded from Trinidad. AQUILON.

18. **MACHAONIA** H. & B. Pl. Aequin. 1: 101. 1806.

Shrubs or trees, often armed with slender spines, the leaves opposite, mostly small, entire, the small white flowers in terminal corymbose panicles. Calyx-tube turbinate or oblong, its 4 or 5 lobes persistent. Corolla funnelform, villous in the throat, the limb 4-lobed or 5-lobed. Stamens 4 or 5, borne on the corolla-throat. Ovary 2-celled, rarely 3-celled; style filiform, its branches subspatulate; ovules 1 in each cavity, pendulous. Fruit turbinate or obovoid, dry, at length splitting into 2 segments. Seeds cylindric. [Commemorates Machaon, son of Aesculapius, physician at the siege of Troy.] About 20 species, natives of tropical America. Type species: *Machaonia acuminata* H. & B.

1. **Machaonia portoricensis** Baill. Bull. Soc. Linn. Paris 204. 1879.

A shrub, or a small tree 4–6 m. high, much branched, the slender twigs puberulent or glabrous. Spines in pairs at most of the nodes, and terminating short twigs, acicular, 1–2.5 cm. long; leaves broadly ovate or suborbicular to elliptic, 7–16 mm. long, very short-petioled, the apex short-acuminate, acute, obtuse, or rarely emarginate, the base obtuse or narrowed; panicles short-peduncled, pubescent, 1–3 cm. broad, several-many-flowered; pedicels short; calyx-tube turbinate, pubescent, 2–2.5 mm. long, with narrowly lanceolate lobes; corolla 4–5 mm. long, its rounded lobes about one-half as long as the tube; fruit turbinate, pubescent, 4–5 mm. long, crowned by the calyx-lobes.

Rocky hillsides, woods and thickets at lower elevations in the southwestern and western districts of Porto Rico. Endemic. ROSETA.

19. **ERITHALIS** P. Br.; L. Syst. ed. 10. 930. 1759.

Glabrous shrubs or small trees, with broad, dark green, opposite petioled leaves, connate stipules, and small flowers in terminal or also axillary panicles. Calyx-tube globose to ovoid, the short limb truncate or 4–5-toothed. Corolla nearly rotate or salverform, its 5–10 narrow lobes valvate, recurved or spreading. Stamens 5–10, borne at the base of the corolla; filaments filiform; anthers basifixed, narrow. Ovary 5–10-celled; ovules solitary in each cavity, pendulous; style stout. Fruit a small, grooved drupe, containing 5–10 nutlets. [Greek, very green.] About 6 species, of the West Indies, Florida and Central America. Type species: *Erithalis fruticosa* L.

Drupe depressed-globose.
Drupe obovoid.

1. *E. fruticosa*.
2. *E. revoluta*.

1. **Erithalis fruticosa** L. Syst. ed. 10, 930. 1759.

Erithalis odorifera Jacq. Sel. Pl. Am. 72. 1763.

A shrub, 6 dm. to 4 m. high, or a tree up to 8 m. high, with terete branches. Leaves elliptic to oblong, obovate or suborbicular, subcoriaceous, dark green,

shining, 4–15 cm. long, rounded or short-pointed at the apex, mostly narrowed at the base, the petioles 4–20 mm. long; stipules connate, mucronate, the sheath persistent, 1–2 mm. long; panicles peduncled, several-many-flowered; calyx 1–2 mm. long, its limb repand-denticulate; corolla 4–10 mm. long, deeply 5-parted, its lobes linear-oblong; drupe globose or depressed-globose, 5–10-furrowed, 2–5 mm. in diameter, black when mature. [*Getula maritima* of Bello.]

Coastal woods and thickets and on hillsides near the coast, Porto Rico; Icacos; Culebra; Vieques; Mona; Muertos; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda; Anegada;— Florida; West Indies; Central America. Consists of many races, differing in size of the plant, leaves, fruit and flowers, and length of the calyx-limb. JAYAJABICO. BLACK TORCH.

2. ***Erithalis revoluta*** Urban, Symb. Ant. 3: 379. 1903.

A shrub, 3–4 m. high, the young twigs 4-sided. Stipules 1.5–2 mm. long. Leaves oblong-obovate to oblong-lanceolate, coriaceous, rigid, 3–5 cm. long, the apex acute or acuminate, the base narrowed, the margins revolute, the petioles 4–7 mm. long; peduncles axillary, corymbosely few-flowered, about as long as the leaves; calyx turbinate, the 5-toothed limb about as long as the tube, the teeth triangular; corolla 4 mm. long, its linear-lanceolate lobes obtuse; drupe obovoid, 3.5–4 mm. long.

Coastal woods, Caña Gorda, Porto Rico. Endemic.

20. ***Chiococca*** P. Br.; L. Syst. ed. 10. 917. 1759.

Woody vines, or shrubs, with broad subcoriaceous opposite leaves, broad stipules, and small yellow or white flowers in axillary, simple or compound racemes. Calyx-tube ovoid to turbinate, the limb 5-toothed, persistent. Corolla funnelform or narrowly campanulate, with 5 valvate reflexed or spreading lobes. Stamens 5, borne toward the base of the corolla-tube; filaments mostly pubescent, connate at the base; anthers linear, basifixed, not exerted. Ovary 2-celled, rarely 3-celled; style filiform; ovules solitary in each cavity, pendulous. Drupe flattened, leathery, white. Seed-coat membranous; endosperm fleshy. [Greek, snow-berry.] About 10 species, natives of Florida, Bermuda and tropical America, the following typical.

1. ***Chiococca alba*** (L.) Hitchc. Rep. Mo. Bot. Gard. 4: 94. 1893.

Lonicera alba L. Sp. Pl. 175. 1753.

Chiococca racemosa L. Syst. ed. 10, 917. 1759.

A glabrous shrub, 1–3 m. high, with slender spreading branches, or a vine 5 m. long or more. Leaves elliptic, oblong, ovate or lanceolate, 2–8 cm. long, acute, acuminate or bluntish at the apex, narrowed at the base, the midvein prominent, the lateral veins few and obscure, the slender petioles 4–12 mm. long; racemes several-many-flowered, as long as the leaves, or longer, or shorter; corolla 5-lobed nearly to the middle, yellow, 6–9 mm. long; drupes bright white, orbicular, or becoming subglobose, 5–7 mm. broad.

Woods and thickets, Porto Rico, ascending to higher elevations in both dry and moist districts; Mona; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda;— Florida; West Indies, south to Trinidad; continental tropical America. BEJUCO DE BERAC. WEST INDIAN SNOW-BERRY.

21. ***Chione*** DC. Prodr. 4: 461. 1830.

Glabrous trees or shrubs, the leaves opposite, petioled, coriaceous, the stipules deciduous, the small flowers in terminal peduncled panicles. Calyx-tube obconic, the limb 5-toothed or 5-lobed, persistent. Corolla funnelform or

funnel-form-campanulate, the tube stout, the limb 5-lobed, the lobes imbricated. Stamens 5, borne near the base of the corolla-tube; filaments stout; anthers oblong, exserted. Ovary 2-celled; ovules 1 in each cavity, pendulous; style-branches obtuse. Drupe oblong, the pit bony, sulcate. Seeds elongated. [Greek, snow, referring to the white flowers.] Four or five species, natives of the West Indies, the following typical.

1. **Chione venosa** (Sw.) Urban, Symb. Ant. 4: 594. 1911.

Jacquinia venosa Sw. Prodr. 47. 1788.

Crusea glabra A. Rich. Mem. Soc. Hist. Nat. Paris 5: 204. 1830.

Chione glabra DC. Prodr. 4: 461. 1830.

A tree 6–15 m. high. Leaves oblong to elliptic, faintly pinnately veined, 4–12 cm. long, narrowed at both ends, the rather stout petioles 5–20 mm. long; peduncles about as long as the leaves or shorter; panicles 5–8 cm. broad, commonly many-flowered; pedicels stout, 8–15 mm. long; calyx about 3 mm. long, its cup-like limb with 5 short teeth; corolla white, about 5 mm. long, its rounded lobes about half as long as the tube; drupe 12–16 mm. long.

Woods and hillsides in moist or wet districts of Porto Rico, ascending to higher elevations; St. Croix and St. Thomas (according to Eggers); Tortola;—Hispaniola; Montserrat to Tobago; British Guiana. MARTIN AVILA.

22. **SCOLOSANTHUS** Vahl, Eclog. 1: 11. 1796.

Shrubs, mostly spiny, with opposite coriaceous, short-petioled or sessile leaves, and small axillary, solitary or fascicled flowers. Calyx-limb 4-cleft, the lobes persistent. Corolla funnel-form, the limb 4-lobed, the lobes short. Stamens 4, borne on the corolla; filaments filiform, connate and pilose at the base; anthers erect, included. Ovary 2-celled; ovules 1 in each cavity, pendulous; style slender, pilose; stigma notched or 2-lobed. Fruit a small compressed globose ellipsoid or oblong drupe containing 1 or 2 nutlets. [Greek, curved-flower.] About 6 species, natives of the West Indies. Type species: *Scolosanthus versicolor* Vahl.

Spines recurved, 2–3 cm. long; leaves 3–6 cm. long.

Spines straight, 1.5 cm. long or less; leaves only 6–8 mm. long.

1. *S. grandifolius*.

2. *S. versicolor*.

1. **Scolosanthus grandifolius** Krug & Urban; Urban, Symb. Ant. 1: 442. 1899.

A glabrous shrub, 1–2 m. high. Leaves oval to elliptic, shining, 3–6 cm. long, the apex obtuse or acutish, the base narrowed or obtuse, the petioles 3–8 mm. long; stipular sheath about 1 mm. long, truncate; spines mostly 3-forked from the base, stiff, recurved, 2–3 cm. long; flowers fascicled in the axils and on the spines, few or several together; pedicels 1–3 mm. long; calyx about 3 mm. long, its short lobes triangular, acute; corolla yellowish-white, 6–8 mm. long, its ovate-oblong lobes about one-half as long as the tube; fruit (immature) ellipsoid, 4 mm. long.

Forests and slopes, at higher elevations in the western mountains of Porto Rico. This species was mentioned and illustrated, but not described, by Urban in Ber. Deutsch. Bot. Gesell. 15: 267, pl. 9, f. 23, in 1897. Endemic. ESPUELA DE GALAN.

2. **Scolanthus versicolor** Vahl, Eclog. 1: 11. 1796.

Chomelia versicolor Spreng. Syst. 1: 410. 1825.

A shrub, 1–3 m. high, the slender densely leafy twigs scabrous-puberulent. Leaves fascicled, obovate or orbicular-obovate, coriaceous, 6–8 mm. long, shining above, dull beneath, the apex rounded or obtuse, the base narrowed or cuneate, the petioles only about 0.5 mm. long; stipules minute; spines straight, mostly

2-forked near or above the base, rarely 3-forked, 10–15 mm. long; flowers solitary in the axils or at the ends of the spines; calyx subcylindric, about 4 mm. long, its lobes much shorter than the tube; corolla 4–5 mm. long, violet or yellowish; fruit oblong, white, about 3 mm. long.

Woods and thickets near the southern coast of Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan; Virgin Gorda. Endemic.

23. **COFFEA** L. Sp. Pl. 172. 1753.

Shrubs or small trees, with broad leaves, and white fragrant flowers clustered in the axils. Calyx-tube turbinate or oblong. Corolla funnelform or salverform, the 4 or 5 oblong lobes obtuse or spreading, contorted. Stamens 4 or 5, borne at the mouth of the corolla, the filaments very short, the anthers linear, twisted or curved after dehiscence. Ovary 2-celled; ovules 1 in each cavity; style 2-branched. Berry oblong or globose, containing 2 hard convex nutlets. [Name from the Arabic.] About 20 species, natives of the Old World, the following typical.

1. **Coffea arabica** L. Sp. Pl. 172. 1753.

Glabrous, 1–7 m. high, the trunk slender, usually straight, the bark gray. Leaves elliptic to oblong, dark green, somewhat shining, pinnately veined, 7–15 cm. long, acute or acuminate at the apex, narrowed or obtuse at the base, the rather stout petioles about 1 cm. long or less; flowers several together in the axils, short-pedicelled; calyx about 3 mm. long, nearly truncate; corolla-tube 6–10 mm. long, its lobes rather longer; anthers shorter than the corolla-lobes; berry oblong to globose, smooth, 10–16 mm. long.

Hillsides, thickets and woodlands, spontaneous after cultivation, one of the most important crops of Porto Rico; St. Croix; St. Thomas; St. Jan. Widely cultivated and spontaneous in the West Indies. Native of tropical Africa. Its white wood is heavy, hard and tough, its flowers fragrant. CAFÉ. COFFEE.

Many kinds of Coffee of the Arabian the Liberian and the robustoid groups have, been experimentally grown in Porto Rico, especially at the Agricultural Experiment Station at Mayaguez, under the direction of Mr. T. B. McClelland, Horticulturist. This valuable collection was seen with high appreciation in March 1925, luxuriant in a shaded valley. Mr. McClelland has described, discussed and illustrated these coffee varieties in Bulletin No. 30 of the Mayaguez Station, published in 1924.

The Porto Rico cafetals, mostly on lands between 250 and 650 m. elevation, serve as forests in retarding the washing of mountain-sides by rain.

24. **IXORA** L. Sp. Pl. 110. 1753.

Shrubs or trees, with opposite or verticillate coriaceous or chartaceous leaves, the large flowers in terminal corymbs or in lateral clusters. Calyx-tube ovoid, the limb 4–5-toothed. Corolla salverform, the slender tube nearly cylindric, the spreading limb 4–5-lobed, the lobes contorted. Stamens 4 or 5, borne on the corolla-throat; filaments very short or wanting; anthers linear or oblong. Ovary 2-celled; ovules 1 in each cavity, borne on the septum; style filiform. Berry coriaceous or fleshy, containing 2 pyrenes. Seeds ascending [Malabar name.] Over 100 species of tropical regions. Type species: *Ixora coccinea* L.

1. **Ixora ferrea** (Jacq.) Benth. Linnaea 23: 447. 1850.

Sideroxyloides ferreum Jacq. Sel. Pl. Am. 19. 1763.

Siderodendrum triflorum Vahl, Eclog. 1: 10. 1796.

Pavetta quinqueflora Sessé & Moc. Fl. Mex. ed. 2, 18. 1894.

A glabrous tree, 5–10 m. high, or often shrubby. Stipules triangular, subulate-tipped, 5–7 mm. long; leaves oblong to elliptic, subcoriaceous, 8–20 cm. long

faintly pinnately veined, the apex acute or acuminate, the base narrowed or obtuse, the stout petioles 6–15 mm. long; flowers few, in small sessile 3-forked clusters, axillary or at nodes below the leaves; pedicels short; calyx red, about 2 mm. long, with 4 acute teeth; corolla white or reddish, its tube slender, 10–12 mm. long, 3–4 times as long as the 4-lobed limb; berry globose, about 10 mm. in diameter.

Forests and wooded hills, Porto Rico, in wet or moist districts, ascending to higher elevations; St. Thomas; St. Jan; Tortola:—Cuba; St. Kitts to Grenada; continental tropical America. The dark brown wood is very hard, heavy, strong and tough. PALO DE DAJAO. PALO DE HIERRO.

***Ixora coccinea* L.** CRUZ DE MALTA, BURNING LOVE, East Indian, often planted for ornament in Porto Rico and the Virgin Islands, is a glabrous shrub, up to about 2 m. high, the leaves oblong to oblanceolate, sessile, often cordate, 5–10 cm. long, the red or scarlet flowers commonly numerous in terminal corymbs, the slender corolla-tube about 5 cm. long, the widely spreading limb about 2 cm. broad, with 5 acute lobes. [*I. Baudhuca* Roxb.]

***Ixora stricta* Roxb.**, East Indian, recorded as formerly grown on St. Thomas, has oblong leaves 10–15 cm. long and terminal, densely many-flowered corymbs of orange or flame-colored flowers, the corolla-lobes obtuse.

***Ixora acuminata* Roxb.**, BOLA DE NIEVE, also East Indian, a tall shrub, occasional in Porto Rico gardens, has oblong-lanceolate or oblanceolate leaves and large terminal corymbs of white flowers, the very slender corolla-tube much longer than the limb.

***Ixora lutea* Hutchinson**, of horticultural origin, with pale yellow flowers, was grown at the Trujillo Plant Propagation Station, Porto Rico, in 1925.

***Ixora parviflora* Vahl**, of India, also grown at the Trujillo Station in 1925, has oblong or elliptic subsessile leaves 7–15 cm. long, the flowers white, odorous.

25. **STRUMPFIA** Jacq. Enum. 8, 28. 1760.

A low, much-branched shrub, with linear, revolute-margined, coriaceous, very short-petioled leaves, verticillate in 3's and crowded near the ends of the short-jointed branches, the small white flowers in short axillary racemes, the small stipules persistent. Calyx ovoid, the limb 5-cleft, the lobes persistent. Corolla deeply 5-cleft, the lobes lanceolate, imbricated, the tube very short. Stamens 5, borne at the base of the corolla-tube; filaments short, slightly united at the base; anthers narrowly oblong, connate. Ovary 2-celled; ovules 1 in each cavity, erect, anatropous; style pubescent; stigma 2-lobed. Fruit a small fleshy drupe, containing 1 or 2 nutlets. Seed oblong; endosperm fleshy; embryo minute. [Named for Karl Strumpf.] A monotypic West Indian genus.

1. **Strumpfia maritima** Jacq. Enum. 28. 1760.

A shrub 2 m. high or less, the rather stout twigs densely pubescent or puberulent, scarred by the persistent stipule-bases. Leaves 1–2.5 cm. long, apiculate, pubescent when young, the margins revolute so as to meet and cover the under surface; peduncles pubescent, 2–10 mm. long; calyx about 1 mm. long; calyx-lobes triangular-ovate, acute; corolla pubescent, 3–4 mm. long, its short tube campanulate, its lobes much longer than the tube; drupes white or red, 3–6 mm. in diameter.

Coastal hills, rocks and thickets, southwestern districts of Porto Rico; Mona; Muertos; Vieques; Anegada:—Florida; Jamaica; Cuba; Hispaniola; Anguilla to Guadeloupe; Bonaire; Curaçao; Aruba; Yucatan.

26. **PSYCHOTRIA** L. Syst. ed. 10, 929. 1759.

Shrubs or trees, rarely perennial herbs, with opposite or sometimes verticillate leaves, the stipules persistent or deciduous, the small flowers in terminal corymbs or panicles, rarely axillary. Calyx short, the limb 4-5-toothed. Corolla short, funnelform or subcampanulate, the limb 4-5-lobed, the lobes valvate. Stamens 5, borne on the corolla-throat, the filaments mostly short, the anthers linear or oblong. Ovary 2-celled; ovules 1 in each cavity, erect, anatropous; stigma 2-cleft. Fruit a globose to oblong drupe containing 2 or 3 pyrenes, smooth, angled or ribbed. [Greek, to give life, from supposed medicinal properties.] A very large genus, containing 500 species or more, natives of tropical and subtropical America, those of Porto Rico known as **PALO MORO**. Type species: *Psychotria asiatica* L., of Jamaica. The plants are sometimes called **WILD COFFEE**, or **PALO DE COCHIMBO**.

A. Parasitic on forest trees.

B. Not parasitic.

1. Herbaceous; scarcely woody; tall.

2. Shrubs or trees.

*Pyrenes smooth, ribbed or furrowed; fruit mostly longer than broad.

†Bractlets small, or minute, not longer than the calyx.

‡Pyrenes at length separating from each other; fruit nearly smooth.

‡‡Pyrenes not separating.

§Leaves oblong, small, 7 cm. long or less, their odor strongly offensive.

§§Leaves larger, elliptic to obovate, not offensive in odor.

Stipules not long-acuminate nor filiform-tipped.

Stipules connate, tubular, at least below.

Inflorescence sessile.

Inflorescence peduncled.

Fruit not coronate or scarcely coronate.

Leaves acuminate; pedicels slender.

Leaves obtuse; pedicels stout.

Fruit coronate by the calyx-tube.

Stipules distinct; inflorescence peduncled.

Stipules long-acuminate or filiform-tipped, distinct.

Stipules broadly ovate; fruit globose.

Stipules lanceolate; fruit oblong.

††Bractlets larger, longer than the calyx; fruit blue.

Fruit oblong; bractlets ovate.

Fruit depressed-globose; bractlets linear-lanceolate.

**Pyrenes angled or crested; fruit subglobose or didymous, as broad as long or broader.

Inflorescence pubescent or puberulent, many-flowered.

Inflorescence corymbose-paniculate.

Inflorescence thyrsoid-paniculate.

Inflorescence glabrous or nearly so, few-several-flowered.

1. *P. Grosourdyana*.2. *P. uliginosa*.3. *P. pinularis*.4. *P. maleolens*.5. *P. undata*.6. *P. ligustrifolia*.7. *P. maricaensis*.8. *P. revoluta*.9. *P. Brownei*.10. *P. grandis*.11. *P. tenuifolia*.12. *P. brachiata*.13. *P. involucreta*.14. *P. pubescens*.15. *P. Berteriana*.16. *P. patens*.1. **Psychotria Grosourdyana** (Baill.) Urban, Symb. Ant. 4: 596. 1911.

Loranthus portoricensis DC. Prodr. 4: 293. 1830. Not *Psychotria portoricensis* DC.

Phthirusa portoricensis Eichl. in Mart. Fl. Bras. 5^o: 134. 1868.

Uragoga Grosourdyana Baill. Adansonia 12: 227. 1879.

Dendropemon portoricensis van Tiegh. Bull. Soc. Bot. France 41: 69. 1894.

Psychotria pendula Grosourdyana Urban, Symb. Ant. 1: 445. 1899.

Glabrous, somewhat fleshy; stems pendent, slender, 3-7 dm. long. Leaves lanceolate or oblong-lanceolate, 2-4 cm. long, acuminate, the base narrowed or obtuse, the petioles 2-4 mm. long; panicles small, purple, few-flowered, axillary and terminal, peduncled, shorter than the leaves; bracts linear-lanceolate, about

1.5 mm. long; pedicels short; calyx purple, 1.5 mm. long, its lobes triangular, acute or acuminate; corolla white, about 3 mm. long; berry black, oval or obovoid, 2–3 mm. long, containing 3 pyrenes. [*Uragoga portoricensis* of Cook and Collins.] *Loranthus brasiliensis* of Sprengel, not of Desvaux.

Parasitic on trees in forests of Porto Rico at middle and higher elevations. Endemic.

2. ***Psychotria uliginosa*** Sw. Prodr. 43. 1788.

Psychotria laevis DC. Prodr. 4: 505. 1830.

Cephaelis triplocephala Bello, Anales Soc. Esp. Hist. Nat. 10: 282. 1881.

Herbaceous, glabrous, somewhat succulent, 0.6–2 m. high, the stem erect or ascending. Leaves elliptic to obovate, 1–2.5 dm. long, dark green above, pale beneath, the lateral veins distant, ascending, the apex abruptly acute or short-acuminate, the base narrowed or cuneate, the petioles 2–6 cm. long; stipules acute, the upper part deciduous, the lower part sheathing, persistent, panicles axillary, peduncled, the flowers glomerate at the ends of its few branches; calyx about 2 mm. long, its limb 5-toothed; corolla white or reddish, 2–3 mm. long; berry scarlet or crimson, ellipsoid, 6–8 mm. long, the pyrenes 3-crested.

Woods and forests, Porto Rico, in wet or moist districts ascending to higher elevations; St. Croix (?):—Jamaica; Cuba; Hispaniola; Guadeloupe and Dominica to Trinidad; recorded from Saba and St. Eustatius and from Central America and Guiana. TRES-CABEZAS.

3. ***Psychotria pinularis*** Sessé & Mocino, Fl. Mex. ed. 2, 57. 1894.

A shrub, sometimes vine-like, 1–5 m. high, irregularly widely branched, the twigs glabrous, slender. Leaves elliptic to obovate-elliptic, membranous, 4–9 cm. long, the apex acute or acuminate, the base narrowed, the axils of the veins beneath with small tufts of hairs, the upper surface glabrous, the petioles 5–20 mm. long; stipules short, apiculate; peduncles terminal, mostly shorter than the leaves; panicles few-several-flowered; bractlets small; pedicels short; calyx 3–4 mm. long; corolla salverform, 4–5 mm. long, its lobes nearly half as long as the tube; fruit subglobose, red, smooth, 4–6 mm. in diameter, the pyrenes at length separating. [*P. horizontalis* of Grisebach and of Bello, not of Swartz.]

Thickets, arroyos and hillsides at lower and middle elevations in moist and dry parts of the eastern and central districts of Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Cuba; Hispaniola; St. Martin; Grenada; Trinidad; Margarita; Guiana.

4. ***Psychotria maleolens*** Urban, Symb. Ant. 1: 444. 1899.

A shrub, 1–3 m. high or a tree, recorded as sometimes 10 m. in height, the foliage malodorous, the young twigs glabrous or minutely pilose. Stipules connate, deciduous, the sheath about 2 mm. long, the teeth about half as long, nearly subulate; leaves oblong to oblong-ob lanceolate or linear-oblong, subchartaceous, 3–7 cm. long, glabrous the apex acute or short-acuminate, the base narrowed, the petioles 3–7 mm. long; inflorescence terminal, short-peduncled, few-flowered, minutely pilose; bractlets small, triangular, apiculate; pedicels 2.5 mm. long or shorter; calyx about 1.5 mm. long, its small teeth triangular; corolla white, about 6 mm. long, its lobes nearly as long as the tube; fruit oblong, red, 6–8 mm. long, 10-ribbed.

Forests at higher elevations in the eastern mountains of Porto Rico. Endemic.

5. ***Psychotria undata*** Jacq. Hort. Schoen. 3: 5. 1798.

Psychotria hirsuta Spreng. Syst. 1: 744. 1825. Not Sw. 1788.

Psychotria oligotricha DC. Prodr. 4: 514. 1830.

Psychotria portoricensis DC. Prodr. 4: 515. 1830.

A shrub, 0.5–3 m. high, the twigs, leaves and inflorescence glabrous or pubescent. Leaves elliptic to oblong-elliptic, chartaceous, 6–12 cm. long, strongly

pinnately veined, acuminate at the apex, narrowed at the base, bright green above, pale green beneath; the slender petioles 15 mm. long or less, the stipules connate-sheathing, deciduous; panicles terminal, sessile, several-many-flowered; flowers sessile or very nearly so; calyx about 1 mm. long, its limb nearly truncate; corolla white, about 4 mm. long, its lobes shorter than the tube; fruit red, ellipsoid, blunt, 5-7 mm. long; pyrenae grooved. [*P. glabrata* of Eggers, not of Swartz.]

Thickets and hillsides, Porto Rico, at lower and middle elevations in dry or moist districts; Mona; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Florida, West Indies south to Barbados. Central America. Recorded from Trinidad. In Porto Rico the pubescent plants of this species are mostly found in the dry southern districts.

6. *Psychotria ligustrifolia* (Northrop) Millsp. Field Mus. Bot. 2: 172. 1906.

Myrstiphyllum ligustrifolium Northrop, Mem. Torr. Club 12: 68. 1902.

Psychotria bahamensis Millsp.; Britton, Bull. N. Y. Bot. Gard. 3: 451. 1905.

Psychotria Stahlia Urban, Symb. Ant. 4: 598. 1911.

A nearly glabrous shrub, rarely more than 2.5 m. high. Leaves thin, lanceolate to oblanceolate, slightly pilose beneath, especially along the midrib, acuminate at the apex, the base narrowed; stipules large, orbicular, sheathing, apiculate; inflorescence paniculate, peduncled, exceeded by the leaves; calyx with 5 short deltoid teeth; corolla about 5 mm. long, glabrous without, bearded in a ring at the insertions of the filaments within, its lobes elliptic, strongly deflexed, nearly as long as the tube; fruit ellipsoid, red, about 5 mm. long; pyrenes plano-convex, grooved. [*P. scandens* of Bello, not of Hooker and Arnott, *P. nutans* of Stahl, not of Swartz.]

Thickets and hillsides at lower and middle elevations, in moist parts of the northern and western districts of Porto Rico:—Florida; Bermuda; Bahamas; Cuba; Hispaniola.

7. *Psychotria maricaensis* Urban, Symb. Ant. 1: 447. 1899.

A glabrous shrub, with many terete branches. Stipules 7-10 mm. long, united below, membranous, deciduous. Leaves elliptic to obovate, 4-7 cm. long, subcoriaceous, obtuse, the base narrowed, the petioles 4-12 mm. long, the lateral veins delicate, distant; peduncles terminal, about as long as the leaves; panicles small, few-several-flowered, their branches stout; bractlets about 1 mm. long; flowers sessile; calyx about 3 mm. long, its teeth very short; fruit oval, about 6 mm. long, the pyrenes 4-sulcate.

Serpentine slopes in the western districts of Porto Rico at middle and higher elevations. Endemic.

8. *Psychotria revoluta* DC. Prodr. 4: 517. 1830.

Psychotria Sintenisii Urban, Symb. Ant. 1: 448. 1899.

A much branched shrub, 2-3 m. high, glabrous, or the twigs and inflorescence puberulent. Stipules 5-8 mm. long, tubular below, deciduous. Leaves oblong or elliptic, subcoriaceous, 4-7 cm. long, the apex acuminate, the base narrowed, the petioles 5-10 mm. long; peduncles terminal, slender, about as long as the leaves or shorter; panicles few-several-flowered; flowers sessile; bractlets triangular, short; calyx about 2 mm. long, its limb subtruncate; corolla 6-8 mm. long, villous in the throat, its oblong lobes shorter than the tube; fruit orange, about 5 mm. long, crowned by the persistent calyx-limb, the pyrenes 4-sulcate.

Thickets and hillsides near the southwestern coast of Porto Rico:—Cuba; Hispaniola.

9. *Psychotria Brownei* Spreng. Syst. 1: 742. 1825.

A glabrous shrub or small tree, 1-4 m. high, the twigs rather slender. Leaves elliptic or some of them elliptic-obovate, chartaceous, 6-15 cm. long, the lateral

veins ascending, the apex acute, the base narrowed, the petioles 2 cm. long or shorter; stipules triangular-ovate, acute, distinct, 5–6 mm. long, deciduous; peduncles terminal and often lateral, shorter than the leaves; panicles corymbiform, often many-flowered, in fruit up to 9 cm. broad; pedicels short; fruit red, ellipsoid, 4–5 mm. long, sulcate. [*P. asiatica* of West, not of Linnaeus; *P. tenuifolia* of Millsap, not of Swartz.]

Thickets and hillsides, southern and western parts of Porto Rico, at lower and middle elevations; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Cuba; Antigua; recorded from Grenada; erroneously recorded from Jamaica. We have not seen the flowers of this plant.

10. ***Psychotria grandis*** Sw. Prodr. 43. 1788.

A tree, about 6 m. high or less, the wood soft. Stipules broadly ovate, subulate-tipped, 1.5–2 cm. long, distinct, deciduous; leaves obovate or broadly oblanceolate, chartaceous, glabrous, 1.5–3.5 dm. long, acute or acuminate, the base cuneate, decurrent on the short petiole; peduncles terminal, elongated, often as long as the leaves; panicles large, many-flowered, puberulent; bractlets small; flowers sessile or very short-pedicelled, clustered; calyx pubescent, about 1 mm. long, its limb minutely toothed; corolla about 4 mm. long; fruit globose, about 5 mm. in diameter, sulcate.

Forests and wooded hills, Porto Rico, in wet or moist districts, ascending to higher elevations:—Cuba; Jamaica; Hispaniola; Central America.

11. ***Psychotria tenuifolia*** Sw. Prodr. 43. 1788.

A shrub, about 4 m. high or lower. Stipules lanceolate, distinct, 2-cleft, the lobes subulate-tipped, about 1 cm. long, deciduous. Leaves elliptic to narrowly elliptic, obovate, subchartaceous, glabrous, or puberulent on the veins beneath, 1–2.5 dm. long, the apex acute or acuminate, the base narrowed or cuneate, the petioles 1–2 cm. long; panicles terminal, puberulent or glabrate, sessile or short-stalked, several-many-flowered, the clustered flowers very short-pedicelled; bractlets small; calyx 1.5–2 mm. long, 5-toothed; corolla about 3 mm. long, its lobes about as long as the tube; fruit oblong, sulcate, 6–7 mm. long.

Forests at middle and higher elevations in the central mountains of Porto Rico; St. Croix (according to Eggers); St. Thomas:—Cuba; Hispaniola; Dominica to Grenada; Venezuela.

12. ***Psychotria brachiata*** Sw. Prodr. 45. 1788.

Psychotria neurotricha DC. Prodr. 4: 505. 1830.

A shrub, 2–4 m. high, or a small tree 5–8 m. high (recorded as sometimes 15 m.), the young twigs glabrous or sparingly pubescent. Stipules 5–7 mm. long, toothed or lacerate, united below, persistent. Leaves elliptic or elliptic-obovate, chartaceous, 0.8–2 dm. long, the apex mostly acuminate, the base narrowed or rarely obtuse, the petioles 6–20 mm. long; panicles terminal, peduncled or sessile, pubescent, mostly longer than broad, many-flowered, the flowers glomerate, sessile; bractlets ovate, 2–3 mm. long, somewhat longer than the calyx; corolla 5–6 mm. long, white; fruit blue, ovoid-oblong, grooved, about 3 mm. long, crowned by the calyx-limb.

Woods, thickets and hillsides, Porto Rico, at lower and middle elevations in moist or wet districts:—Jamaica; Cuba; Hispaniola; Trinidad; Central America.

13. ***Psychotria involucrata*** Sw. Prodr. 45. 1788.

Psychotria tribracteata C. Wright; Griseb. Cat. Pl. Cub. 137. 1866.

A shrub, 0.5–2 m. high, the branches slender, glabrous. Stipules 2-cleft or 2-parted, persistent, the narrow segments 3–4 mm. long. Leaves elliptic to ovate

or ovate-lanceolate, glabrous, shining, strongly veined, 4–12 cm. long, short-petioled, the apex acute or acuminate, the base narrowed or obtuse; peduncles terminal, short, pubescent, few-flowered; flowers sessile, involucre by linear-lanceolate purplish bractlets 6–8 mm. long; calyx minutely 5-toothed; fruit blue, globose, about 4 mm. in diameter, the pyrenes crested. [? *P. umbellata* of Stahl, not of de Candolle.]

Thicket near Bayamon, Porto Rico, collected only by Stahl:—Jamaica; Cuba; Trinidad; Guiana. The plant recorded by Stahl was known as CACHIMBO VERDE.

14. ***Psychotria pubescens*** Sw. Prodr. 44. 1788.

A shrub, 3 m. high or less, rarely a small tree 5 m. high, the branches slender, sometimes constricted at the nodes, the twigs, leaves and inflorescence finely pubescent or puberulent, rarely glabrous. Leaves membranous, elliptic to oblong-lanceolate, 7–15 cm. long, acuminate at the apex, narrowed at the base, prominently pinnately veined, the slender petioles 8–18 mm. long, the subulate geminate stipules united by their broad bases; panicles peduncled, usually many-flowered; pedicels very short; calyx about 1 mm. long, its teeth ovate; corolla yellow, whitish or pinkish, 4–5 mm. long, usually puberulent outside, pubescent in the throat, its oblong lobes shorter than the tube; drupe subglobose, black, 3–4 mm. in diameter, the pyrenes angled. [*P. Berteriana* of Bello, not of de Candolle.]

Woods, thickets and hillsides at lower and middle elevations, Porto Rico; St. Thomas;—Bahamas; Jamaica; Cuba; Hispaniola; St. Kitts; Central America.

15. ***Psychotria Berteriana*** DC. Prodr. 4: 515. 1830.

Psychotria platyphylla DC. loc. cit. 517. 1830.

Psychotria platyphylla angustior Urban, Symb. Ant. 1: 449. 1899.

A tree, 5–10 m. high, sometimes lower and shrubby, the twigs glabrous or puberulent. Leaves nearly membranous, elliptic to obovate-elliptic, 0.5–2 dm. long, glabrous above, puberulent on the midvein beneath, the apex acute or acuminate, the base narrowed or rarely rounded, the petioles 1–5 cm. long; stipules 2-cleft, about 4 mm. long, the ovate lobes acute; panicles terminal, peduncled, pubescent, many-flowered, 8–15 cm. long, longer than broad; bractlets small; flowers short-pedicelled or sessile; calyx yellowish, about 1.5 mm. long, its teeth acute; corolla white, 4–5 mm. long, deeply lobed; fruit black when mature, subglobose, 4–5 mm. in diameter, the pyrenes crested. [*P. pedunculata* of Stahl, not of Swartz.]

Forests and ravines, Porto Rico, at middle and higher elevations in wet or moist districts:—Jamaica; Cuba; Hispaniola; St. Kitts and Montserrat to Trinidad; Colombia.

16. ***Psychotria patens*** Sw. Prodr. 45. 1788.

Psychotria flexuosa Willd. Sp. Pl. 1: 966. 1798.

Palicourea patens Urban, Repert. 18: 197. 1922.

A glabrous slender shrub, 1–3 m. high. Stipules deeply 2-cleft, persistent, the linear-subulate lobes about 7 mm. long or shorter. Leaves ovate to elliptic or lanceolate, subchartaceous, 5–14 cm. long, acuminate, the base narrowed or obtuse, the petioles 3–10 mm. long; panicles terminal, slender-peduncled, few-several-flowered, their short branches divaricate; bractlets small or none; calyx about 1 mm. long, its lobes minute; corolla white, 5–8 mm. long, its tube slender; fruit didymous, blue or purplish, 3–5 mm. broad, the pyrenes angled.

Mountain forests, Porto Rico, at middle and higher elevations in moist districts:—Jamaica; Cuba; continental tropical America.

Psychotria laxa Sw., an unidentified species of Jamaica, was recorded by Krebs from St. Thomas, evidently in error.

Psychotria nutans of Bello, not of Swartz, has not been referred to a known species by subsequent botanists.

Psychotria myrstiphyllum Sw., recorded by Cook and Collins as occurring in the Sierra de las Piedras, Porto Rico, is an error in determination; the species is endemic in Jamaica.

An exotic tree, about 5 m. high, apparently of this genus, was seen in the collection of the Experiment Station, Mayaguez, in 1923. It has oblong leaves 8–13 cm. long, the apex acute, the base narrowed into a short petiole, the fruiting panicle about 3.5 cm. broad, the globose-pyriform fruits about 6 mm. in diameter.

27. **PALICOUREA** Aubl. Pl. Guian. 1: 172. 1775.

Shrubs or trees, with opposite leaves, the stipules connate below, mostly 2-lobed or 2-parted, persistent or deciduous, the flowers in terminal panicles, sessile or short-pedicelled. Calyx turbinate or hemispheric, its limb 5-toothed or sometimes entire. Corolla elongated, its tube subcylindric or narrowly funnel-form, often gibbous at the base, its 5 lobes valvate, the throat often villous. Stamens 5, borne on the corolla-throat, the anthers mostly linear, obtuse. Ovary mostly 2-celled; ovules 1 in each cavity, erect; stigma 2-lobed. Fruit a small drupe, containing 2 angled or crested pyrenes. [Guiana name.] Perhaps 125 species or more, natives of tropical America. Type species: *Palicourea guianensis* Aubl.

Stipules deciduous; flowers in 3's on the panicle-branches; corolla white to pink.

Stipules persistent; flowers not clustered in 3's.

Corolla violet, rose, yellow or red; leaves slender-petioled.

Corolla 15–20 mm. long, violet to rose or yellow or nearly white.

Corolla 8–12 mm. long, red or yellow.

Inflorescence thyrsoid-paniculate; corolla red.

Corolla 8–10 mm. long; panicle compound.

Corolla about 6 mm. long; panicle nearly simple.

Inflorescence corymbose-paniculate; corolla yellow.

Corolla white; leaves large, short-petioled.

1. *P. domingensis*.

2. *P. alpina*.

3. *P. crocea*.

4. *P. brevithyrsa*.

5. *P. riparia*.

6. *E. barbinervia*.

1. **Palicourea domingensis** (Jacq.) DC. Prodr. 4: 529. 1830.

Psychotria domingensis Jacq. Enum. 16. 1760.

Psychotria Pavetta Sw. Prodr. 45. 1788.

Pavetta pentandra Sw. Fl. Ind. Occ. 1: 233. 1797.

Psychotria Westii DC. Prodr. 4: 516. 1830.

Palicourea Pavetta DC. Prodr. 4: 525. 1830.

Psychotria pseudopavetta Bello, Anales Soc. Esp. Hist. Nat. 10: 281. 1881.

Psychotria incurvata Sessé & Moc. Fl. Mex. ed. 2, 58. 1894.

Palicourea Pavetta rosea Eggers, Bull. U. S. Nat. Mus. 13: 61. 1879.

A glabrous shrub, 1–3 m. high, or a small tree, 4–5 m. high, the terete twigs sometimes constricted under the nodes. Stipules small, 2-lobed, deciduous; leaves elliptic to oblong-elliptic or elliptic-obovate, membranous, 6–20 cm. long, the apex acute or acuminate, the base narrowed, the petioles 5–20 mm. long; panicles peduncled or sessile, corymbiform, 4–7 cm. broad, the flowers subsessile, mostly in 3's at the ends of the branches; calyx about 1.5 mm. long, sharply 5-toothed; corolla white or pink, the slender tube somewhat expanded above, 12–15 mm. long, the slightly unequal spreading lobes about 5 mm. long; fruit compressed-subglobose, black, 5–6 mm. long, the pyrenes 5-crested.

Woods and thickets at lower and middle altitudes in wet or moist districts, Porto Rico; St. Croix; St. Thomas; St. Jan; Tortola:—Jamaica; Cuba; Hispaniola; Saba to Guadeloupe. WILD CAPPEL.

2. **Palicourea alpina** (Sw.) DC. Prodr. 4: 528. 1830.*Psychotria alpina* Sw. Prodr. 44. 1788.

A shrub, 1–3 m. high, or a tree 4–10 m. high, the twigs obtusely 4-angled, glabrous or sparingly pilose. Leaves oblong to elliptic, chartaceous, pilose on the veins beneath, or glabrate, the apex acuminate, the base narrowed, or sometimes obtuse, the petioles 6–16 mm. long; stipules sheathing, subulate-lobed, 6–8 mm. long, persistent; panicles many-flowered, mostly longer than thick, the branches yellow or orange-red; calyx about 3 mm. long, its lobes ovate to lanceolate; corolla glabrous or pubescent, violet-rose or yellow or nearly white, its tube nearly cylindric, gibbous at base, 15–20 mm. long, its limb 6–8 mm. broad; the lobes ovate; fruit compressed laterally, about 6 mm. long, ovate-elliptic, greenish-striped when young, black when mature, the pyrenes low-crested.

Mountain forests at higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; recorded from Dominica.

3. **Palicourea crocea** (Sw.) R. & S. Syst. 5: 193. 1819.*Psychotria crocea* Sw. Prodr. 44. 1788.*Palicourea coccinea* DC. Prodr. 4: 529. 1830.

A nearly glabrous shrub, 1–3 m. high, the slender twigs terete or subterete. Stipules short-sheathing, persistent, subulate-lobed, 3–5 mm. long; leaves ovate or elliptic, chartaceous, 6–20 cm. long, glabrous, or with few hairs in the axils of the veins beneath, and along the midvein, the apex acute or acuminate, the base narrowed, the petioles 5–25 mm. long; panicles pyramidal, usually longer than thick, many-flowered, their branches and the pedicels yellow or orange; calyx yellowish, about 1 mm. long, its lobes short; corolla red, glabrous, 8–10 mm. long, its tube nearly cylindric, its ovate lobes short; fruit ovate, compressed, dark brown or black, 4–5 mm. long, the pyrenes crested.

Woods, thickets and hillsides, Porto Rico, in wet or moist districts at lower and middle elevations—Jamaica; Cuba; Hispaniola; Dominica; Martinique; Grenada; Trinidad; South America. CACHIMBO.

4. **Palicourea brevithyrsa** Britton and Standley, spec. nov.

A wand-like shrub, 5 m. high, the twigs angled, glabrous. Stipules sheathing, persistent, the lobes about 2 mm. long; leaves elliptic or oblong-elliptic, 8–11 cm. long, 2–3.5 cm. wide, pilose on the veins beneath, the slender petioles 1–1.5 mm. long; panicle (immature), 4–5 cm. long, peduncled, the peduncle pubescent, the branches glabrous or nearly so; calyx 2 mm. high, glabrous, its lobes triangular, acute; young buds about 4 mm. long, pubescent.

Mountain forest, Monte Cerrote, near Adjuntas, Porto Rico, (Britton and Brown, 5427, in flower March 15, 1915). Endemic.

5. **Palicourea riparia** Benth. in Hook. Journ. Bot. 3: 224. 1841.

A shrub, 1–4 m. high, or a small tree 5 or 6 m. high, glabrous or very nearly so, the leaves and stipules similar to those of *Palicourea crocea*, the leaves with small tufts of hairs in the axils of the veins beneath, 6–20 cm. long; panicles corymbiform, mostly about as broad as long or broader, many-flowered, their branches and the pedicels red; calyx red or greenish, about 1.5 mm. long; corolla yellow, glabrous, about 12 mm. long, its ovate lobes short; fruit broadly ovate, compressed, black, about 5 mm. long, the pyrenes crested. [*Coussaria Froelichia* DC., not A. Rich.; *Palicourea crocea* DC., not R. & S.; *Palicourea coccinea* Bello, not DC.]

Woods, thickets and hillsides, Porto Rico in wet or moist districts, ascending to higher elevations; Tortola:—Jamaica; Cuba; St. Kitts and Montserrat to Trinidad; South America.

6. **Palicourea barbinervia** DC. Prodr. 4: 530. 1830.

A shrub or small tree, 2–8 m. high, the twigs rather stout, glabrous. Stipules 5–8 mm. long, broad, obtuse, 2-lobed, persistent; leaves elliptic, chartaceous, large, 1–2.5 dm. long, glabrous and shining above, the apex short-acuminate, the base mostly narrowed, the mid-vein pubescent beneath, the petioles 8–20 mm. long; panicles large, many-flowered, 8–15 cm. long, longer than thick, their branches yellow or reddish; calyx about 2 mm. long, its short lobes ovate; corolla white, densely tomentulose, 8–10 mm. long, its lobes ovate, short; fruit ovate, about 3 mm. long, the pyrenes crested.

Woodlands at lower and middle elevations in wet or moist districts of Porto Rico:—Jamaica; Cuba; Hispaniola; Trinidad. BALSAMO REAL. TAFETAN.

28. **LASIANTHUS** Jack, Trans. Linn. Soc. 14: 125. 1823.

Shrubs, with opposite petioled leaves, the small flowers fascicled in their axils, the stipules deciduous or persistent. Calyx-tube short, the limb 4–6-toothed, persistent. Corolla funnelform or salverform, its 4–6 spreading lobes valvate, its throat villous. Stamens 4–6, borne on the corolla-throat; filaments short; anthers linear or oblong. Ovary 4–9-celled; ovules 1 in each cavity, erect, anatropous; style-branches 4–9, obtuse. Fruit a small drupe containing 4–9 pyrenes. Seeds narrow, curved, the endosperm fleshy. [Greek, hairy flowers.] About 80 species or more, natives of tropical regions, mostly of the Old World. Type species: *Lasianthus cyanocarpus* Jack.

1. **Lasianthus Moralesii** (Griseb.) C. Wright; Sauvalle, Anales Acad. Habana 6: 125. 1869.

Sabicea Moralesii Griseb. Cat. Pl. Cub. 124. 1866.

A shrub, 1–4 m. high, the branches sometimes elongated and vine-like, pilose or glabrate. Leaves elliptic to obovate or lanceolate, 5–14 cm. long, rather strongly pinnately veined and reticulated, the apex acute or acuminate, the base narrowed or rounded, the petioles 5–15 mm. long; stipules lanceolate, strigose, about 5 mm. long; fascicles few-flowered; flowers sessile; calyx-teeth 4, ovate or ovate-lanceolate, 2–2.5 mm. long; corolla white; drupe globose, about 10 mm. in diameter; white. [Included by Urban in *L. lanceolatus* (Griseb.) Urban, of Cuba.]

Mountain forests of Porto Rico at middle and higher elevations. Cuba; (?) Hispaniola. MATA DE PEO.

29. **GEOPHILA** D. Don, Prodr. Fl. Nep. 136. 1825.

Creeping herbs, rooting at the nodes, with broad, long-petioled, cordate or reniform leaves, the small bracteolate flowers in slender-peduncled umbels. Calyx-limb 5–7-lobed, persistent, the lobes narrow. Corolla tubular-funnelform, its throat villous, its lobes valvate. Stamens borne on the corolla-tube; filaments filiform; anthers narrow. Ovary 2-celled; ovules 1 in each cavity, erect; style slender, its 2 short branches linear. Fruit a small fleshy drupe, containing 2 plano-convex pyrenes. [Greek, ground-loving.] About a dozen tropical species the following typical.

1. **Geophila herbacea** (Jacq.) Schum. in E. & P. Nat. Pflf. 4⁴: 119. 1891.

Psychotria herbacea Jacq. Enum. 16. 1760.

Cephaelis reniformis H.B.K. Nov. Gen. 3: 377. 1819.

Geophila reniformis C. & S. Linnaea 4: 137. 1829.

Mapouria herbacea Muell. Arg. in Mart. Fl. Bras. 6⁵: 427. 1881.

Glabrous or more or less pubescent, the very slender stems 1–3 dm. long. Stipules short, broader than long; petioles 1–6 cm. long; leaf-blades broadly ovate or suborbicular, membranous, 2–6 cm. long, the apex obtuse, rounded or rarely acute, the base cordate; peduncles commonly longer than the petioles; umbels few-flowered; bractlets linear-lanceolate, about as long as the short pedicels or longer; calyx-lobes 2–2.5 mm. long; corolla small, white; drupe globose, scarlet, shining, 8–12 mm. in diameter. [*G. cordata* of Bello, not of Miquel.]

Woodlands in wet or moist districts at lower and middle elevations, Porto Rico, Vieques, St. Thomas, St. Jan.;—Jamaica; Cuba; Hispaniola; Guadeloupe to St. Vincent and Trinidad; continental tropical America and Old World tropics. YERBA DE GUAVÁ. GEOFLA.

30. **FARAMEA** Aubl. Pl. Guian. 1: 102. 1775.

Trees or shrubs, with opposite leaves, persistent or deciduous stipules, and rather small white flowers in terminal clusters. Calyx nearly truncate. Corolla funnelform, its 4 lobes obovate. Stamens 4, with linear anthers. Ovary 1-celled; ovule erect; style nearly filiform, its 2 branches short, narrow. Fruit coriaceous, 1-celled, 1-seeded. Seed with a membranous testa, the embryo very small. [Guiana name.] About 75 species, natives of tropical America. Type species: *Faramea corymbosa* Aubl.

1. **Faramea occidentalis** (L.) A. Rich. Mem. Soc. Hist. Nat. Paris 5: 176. 1834.

Ixora occidentalis L. Syst. ed. 10, 893. 1759.

Coffea occidentalis Jacq. Enum. 16. 1760.

Tetramerium odoratissimum Gaertn. f. Fr. & Sem. 3: 90. 1805.

Faramea odoratissima DC. Prodr. 4: 496. 1830.

A tree, 5–10 m. high, rarely higher, or often shrubby, glabrous throughout. Stipules 2–4 mm. long with a filiform dorsal appendage 3–5 mm. long; leaves oblong to elliptic, subcoriaceous, short-petioled 7–20 cm. long, abruptly acuminate, the base narrowed or rounded; flowers few or several in loose peduncled compound corymbs; pedicels 5–20 mm. long; calyx obconic, about 3 mm. long; corolla nearly subulate in bud, its tube 8–10 mm. long, its linear lobes about as long; stamens included; fruit depressed-globose, 8–10 mm. in diameter, black.

Forests in wet or moist districts of Porto Rico, ascending to higher elevations; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda;—Jamaica; Cuba; Hispaniola; Saba to Trinidad; continental tropical America. CAFEILLO. PALO DE TORO.

31. **MORINDA** L. Sp. Pl. 176. 1753.

Shrubs, vines or trees, with opposite or verticillate leaves, and small mostly perfect, white or red flowers in dense terminal or axillary capitate clusters. Calyx truncate or obscurely toothed. Corolla funnelform or salverform, its 4–7 lobes valvate. Stamens as many as the corolla-lobes, the short filaments adnate to the throat of the corolla. Ovary mostly 2-celled; styles connate; stigmas slender; ovules 1 in each cavity, ascending. Fruit a fleshy syncarp. [Latin, Indian Mulberry.] Forty species or more, of tropical distribution. Type species: *Morinda Roioi* L.

1. **Morinda citrifolia** L. Sp. Pl. 176. 1753.

A small tree, about 6 m. high or less, or shrubby, the twigs glabrous. Leaves large, broadly ovate or elliptic, 1–3 dm. long, distantly pinnately veined, acute or short-acuminate, glabrous except for tufts of hairs in the axils of the veins beneath, the base mostly narrowed, the stout petioles 1–2 cm. long; stipules broad,

rounded, 1–2 cm. long; peduncles opposite the leaves or axillary, about as long as the petioles; flower-heads globose or oval, about 1.5 cm. thick; flowers white; corolla-tube about 6 mm. long; syncarp white, oval or globose, malodorous, 5–7 cm. long.

Coastal sands, Porto Rico; Vieques; St. Thomas; St. Croix; Tortola;—Cuba; Jamaica; Hispaniola; St. Kitts; Guadeloupe; Martinique; Barbados. Native of the East Indies.

32. *ERNODEA* Sw. Prodr. 29. 1788.

Glabrous or somewhat pubescent, low shrubs, the branches erect, decumbent or trailing, with opposite, linear to lanceolate, nearly sessile leaves, the stipules connate into a sheath; flowers small, solitary and sessile in the axils. Calyx-tube short, the limb 4–6-parted, the lobes triangular to linear or subulate, persistent. Corolla white to pink, the tube nearly cylindric, the 4–6 lobes narrow, revolute, valvate. Ovary 2-celled; style slender; stigma subcapitate; ovules 1 in each ovary-cavity. Drupe fleshy, grooved, containing 2 cartilaginous, 1-seeded pyrenes. [Greek, a shoot or off-shoot.] About six species, or more, of Florida and the West Indies. Type species: *Ernodea littoralis* Sw.

1. *Ernodea littoralis* Sw. Prodr. 29. 1788.

A glabrous or glandular-puberulent shrub, 1–16 dm. high, erect, or nearly or quite prostrate, the branches 4-angled, usually densely leafy. Leaves 3–5-nerved, shining, somewhat fleshy, oblong, elliptic, linear-oblong or oblanceolate, 2–3.5 cm. long, 4–10 mm. wide, entire or glandular-serrulate; stipules 1.5–2 mm. long; calyx-lobes linear-lanceolate, longer than the tube; corolla white or pink, its tube 1–1.5 cm. long; fruit subglobose, yellow, 4–6 mm. in diameter, about as long as or somewhat shorter than the calyx-lobes.

Coastal sands and rocks, Porto Rico; Mona; Icacos; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda; Anegada;—Florida; West Indies, south to Guadeloupe; Yucatan; Honduras.

33. *DIODIA* L. Sp. Pl. 104. 1753.

Herbs or vines, with opposite, mostly sessile, entire leaves, the stipules sheathing, and small axillary white lilac or purple flowers. Calyx-tube obconic or obovoid, the limb 2–4-lobed (sometimes 1–6-lobed), often with minute teeth between the lobes. Corolla funnellform or salverform, mostly 4-lobed. Stamens usually 4, inserted on the throat of the corolla; filaments slender; anthers versatile, oblong-linear, exserted. Ovary 2-celled (rarely 3–4-celled); ovules 1 in each cavity; style filiform, simple, or 2-cleft; stigmas 2. Fruit 2-celled, finally separating into 2 indehiscent carpels. Seed oblong, convex on the back; endosperm horny; cotyledons foliaceous; embryo straight. [Greek, thoroughfare, where some species are frequently found.] About 25 species, mostly American. Type species: *Diodia virginiana* L.

Diffusely branched or ascending; leaves lanceolate, 6 mm. wide or less. 1. *D. rigida*.
Climbing or trailing; leaves 10–25 mm. wide.
Rough-pubescent, usually climbing; leaves acute or acuminate. 2. *D. sarmentosa*.
Glabrous, trailing on sand; leaves obtuse or acutish. 3. *D. maritima*.

1. *Diodia rigida* C. & S. Linnaea 3: 341. 1828.

Borreria arida DC. Prodr. 4: 549. 1830.

Diodia polyseta DC. Prodr. 4: 563. 1830.

Spermacoce ciliaris Sessé & Moc. Fl. Mex. ed. 2, 24. 1894.

Perennial, somewhat woody, branched from near the base, the branches quadrangular, prostrate or ascending, pubescent or glabrate, 2–7 dm. long or longer. Stipular sheath short, its bristles filiform, 4–6 mm. long; leaves sessile, lanceolate, scabrous, 1.5–3 cm. long, the lateral venation obsolete, the apex acuminate, aristulate; flowers mostly solitary in the axils, sessile; calyx-teeth linear, about 1 mm. long; corolla funnelform, 12–15 mm. long, white or rose, its lobes ovate or ovate-lanceolate, acute; fruit globose, glabrous or puberulent, about 2.5 mm. in diameter. [Referred by Sprengel to *Bigelovia suaveolens* (Meyer) Spreng.]

Fields, banks and hillsides, Porto Rico, at lower elevations.; St. Thomas:—Florida; Cuba; Hispaniola; recorded south to St. Vincent; Bonaire; Curaçao; Aruba; continental tropical America.

2. ***Diodia sarmentosa*** Sw. Prodr. 30. 1788.

Perennial; stem vine-like, branched, usually climbing, sometimes prostrate, up to 3 m. long, 4-angled, pubescent. Bristles of the stipular sheath setaceous, 4–6 mm. long; leaves oblong or oblong-lanceolate, 3–7 cm. long, scabrous above, strongly pinnately veined, short-pubescent beneath, the apex acute or acuminate, the base narrowed, the petioles about 3 mm. long or shorter; flowers few or sometimes solitary in the axils; calyx-lobes lanceolate, about 1 mm. long; corolla white, about 3 mm. long; fruit ellipsoid or obovoid-ellipsoid, 3.5–4.5 mm. long, puberulent when young, becoming smooth.

Banks and thickets, Porto Rico, at lower and middle elevations in moist districts; St. Thomas (according to Schlechtendal):—Jamaica; Cuba; Hispaniola; Guadeloupe; Martinique; recorded from Trinidad; continental tropical America and Old World tropics.

3. ***Diodia maritima*** Thonn.; Schum. & Thonn. Besk. Guin. Pl. 75. 1827.

Spermacoce commutata Schultes, Mant. 3: 208. 1827.

Diodia nitens Bello, Anales Soc. Esp. Hist. Nat. 10: 283. 1881.

Spermacoce repens Sessé & Moc. Fl. Mex. ed. 2, 23. 1894.

Perennial; stems prostrate, 4-angled, branched, glabrous, 3–15 dm. long. Leaves oblong to oblong-lanceolate, pinnately veined, glabrous, 1.5–3 cm. long, acute or obtuse, nearly sessile, the base narrowed; bristles of the stipular sheath about 3 mm. long; flowers solitary and sessile in the axils; calyx-teeth 4, lanceolate about 2 mm. long; corolla white, 6–7 mm. long, its lobes triangular-ovate; fruit ellipsoid, 5–7 mm. long. [*D. scandens* of Stahl, not of Swartz.]

Coastal sands, Porto Rico; Vieques; St. Thomas:—Cuba; Hispaniola; Central America; Colombia; tropical Africa.

34. **HEMIDIODIA** K. Schum. in Mart. Fl. Bras. 6⁶: 29. 1888.

A perennial, somewhat woody herb, the stems erect or decumbent, sometimes elongated, the lanceolate entire leaves petioled or nearly sessile, the stipular sheath adnate to the petiole, the small white or bluish flowers glomerate at the nodes. Calyx obconic, 4-lobed. Corolla funnelform, 4-lobed, the lobes valvate. Ovary 2-celled; ovules 1 in each cavity; style filiform, exserted; stigma capitate. Fruit dry, dicocous, the cocci dehiscent on the inner side near the base. [Greek half-*Diodia*.] A monotypic genus of tropical America.

1. ***Hemidiodia ocimifolia*** (Willd.) K. Schum. in Mart. Fl. Bras. 6⁶: 29. 1888.

Spermacoce ocimifolia Willd.; R. & S. Syst. 3: 530. 1818.

Spermacoce portoricensis Balb.; DC. Prodr. 4: 552. 1830.

Borreria alternans Bello, Anales Soc. Esp. Hist. Nat. 10: 283. 1881.

Glabrous or somewhat puberulent; stem nearly terete, branched or nearly simple, 0.3–3 m. long, the branches somewhat 4-sided. Leaves lanceolate or

oblong-lanceolate, thin, pinnately veined, 3–6 cm. long, the apex acute or acuminate, the base narrowed, the petioles about 10 mm. long or shorter; glomerules few–several-flowered; calyx-lobes about 0.5 mm. long; corolla about 3 mm. long, its lobes narrowly triangular; cocci about 3 mm. long, puberulent. [*Spermacoce assurgens* of Sprengel, not of Ruiz & Pavon.]

Fields, hillsides and thickets in moist districts of Porto Rico, ascending to higher elevations:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Martinique; Grenada; Trinidad; continental tropical America. POAYA.

35. **BORRERIA** Meyer, Prim. Fl. Esseq. 79. 1818.

Annual or perennial herbs, or shrubby plants, with opposite entire leaves, the stipules sheathing, the flowers perfect, solitary in the axils or in axillary or terminal clusters. Calyx-tube obovoid or turbinate, the lobes persistent, sometimes accompanied by small teeth. Corolla white, pink or blue, funnellform or salverform, the lobes 4, valvate, spreading. Stamens 4, adnate to the corolla-tube, sometimes up to its throat. Disk obsolete or cushion-like. Ovary 2-celled; styles wholly or partially united; ovules solitary in each cavity, amphitropous. Fruit leathery or crustaceous, the 2 carpels opening along their inner faces. [In honor of W. Borrer, British lichenologist.] About 90 species, natives of tropical and warm regions. Type species: *Borreria suaveolens* Meyer.

Annuals or no. 1 perennial; stems spreading or ascending; calyx-lobes 4.

Calyx-lobes ovate, much shorter than the capsule.

Calyx-lobes subulate, nearly as long as the capsule.

Perennial, erect, flowers in globose heads; calyx-lobes 2.

1. *B. laevis*.

2. *B. ocimoides*.

3. *B. verticillata*.

1. **Borreria laevis** (Lam.) Griseb. Fl. Br. W. I. 349. 1861.

Spermacoce laevis Lam. Tabl. Encyl. 1: 273. 1791.

Borreria Wyddleriana DC. Prodr. 4: 545. 1830.

(?) *B. laevis Sintenisii* Urban, Symb. Ant. 4: 607. 1911.

Annual or perennial, slightly pubescent, branched, the branches spreading or ascending, 1.5–3 dm. long, somewhat angled. Leaves oblong to elliptic-lanceolate, 2–4 cm. long, acute or acuminate at the apex, narrowed at the base into short petioles, pinnately veined; stipular sheath subtruncate, bearing several bristles 4–6 mm. long; flowers white, about 3 mm. wide, capitate-clustered in the axils; calyx-lobes 4, ovate, minute; fruit obovoid, about 2 mm. long; seeds oblong, striate. [*B. parviflora* of Bello, not of de Candolle.]

Fields, banks and woodlands in moist districts of Porto Rico, ascending to higher elevations; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Florida; Bermuda; West Indies; continental tropical America. YERBA DE GARRO.

2. **Borreria ocimoides** (Burm. f.) DC. Prodr. 4: 544. 1830.

Spermacoce ocimoides Burm. f. Fl. Ind. 34. 1768.

Spermacoce prostrata Aubl. Pl. Guian. 1: 58. 1775.

Spermacoce parviflora Hemsl. Bot. Biol. Mex. 2: 59. 1881.

Annual, 6 dm. high or less, slender, erect or sometimes diffusely branched, glabrous, the stem and branches 4-angled. Leaves linear to oblong-elliptic, or the lower spatulate, 0.5–2.5 cm. long, 1–8 mm. wide, acute, short-petioled; stipular sheath with setaceous teeth 2–3 mm. long; glomerules several-many-flowered, 6–8 mm. in diameter; calyx-lobes 4, subulate, about 0.7 mm. long; corolla white, a little shorter than the calyx-lobes, its lobes ovate; fruit ellipsoid to obovoid, pubescent, nearly 1 mm. long.

Fields, banks and thickets in moist districts at lower and middle elevations, Porto Rico; St. Croix; St. Thomas; St. Jan; Tortola:—Florida; Bahamas; West Indies; continental tropical America; Java. BOTONCILLO.

3. **Borreria verticillata** (L.) Meyer, Prim. Fl. Esseq. 83. 1818.

Spermacoce verticillata L. Sp. Pl. 102. 1753.

Borreria stricta Meyer, Prim. Fl. Esseq. 83. 1818.

Borreria stricta DC. Prodr. 4: 541. 1830.

Perennial, shrubby, erect, branched, glabrous, 3–10 dm. high, the branches angled. Leaves linear or linear-lanceolate, nearly sessile, 2–5 cm. long, acute, with tufts of somewhat smaller ones in their axils; teeth of the stipular sheath setaceous; glomerules terminal or also at one or two of the nodes, dense, globose, about 12 mm. in diameter, many-flowered; calyx-lobes 2, narrow, about 1 mm. long; corolla white, about 2 mm. long, its lobes ovate, acute; capsule subglobose, about 1 mm. in diameter, glabrous. [*Borreria podocephala* of Cook and Collins.]

Fields, banks, hillsides and sand dunes at lower and middle elevations, Porto Rico; Icacos; Vieques; St. Croix (according to Eggers); St. Thomas:—Jamaica; Cuba; Hispaniola; Guadeloupe; Trinidad; continental tropical America. BOTON BLANCO.

Borreria spinosa (Sw.) DC., listed by Krebs from St. Thomas, is presumably an error in identification.

Borreria densiflora DC., also recorded by Krebs from St. Thomas, is a little known species of Jamaica.

36. **SPERMACOCE** L. Sp. Pl. 102. 1753.

Herbs, with 4-sided stems, opposite leaves, the stipules sheathing, and small white flowers, in dense axillary and terminal clusters. Calyx-tube obovoid, or obconic, its limb 4-lobed. Corolla funnelform, 4-lobed. Stamens 4, inserted on the tube of the corolla. Ovary 2-celled; ovules 1 in each cavity; style slender; stigma capitate, or slightly 2-lobed. Capsule coriaceous, didymous, of 2 carpels, one dehiscent, the other usually indehiscent. Seeds oblong, convex on the back; endosperm horny; embryo central; cotyledons foliaceous. [Greek, seed-point, from the sharp calyx-lobes surmounting the carpels.] Two or three species, natives of America. Type species: *Spermacoce tenuior* L.

Annual; capsule pubescent.
Perennial; capsule glabrous.

1. *S. tenuior*.
2. *S. riparia*.

1. **Spermacoce tenuior** L. Sp. Pl. 102. 1753.

Spermacoce tenuior angustifolia Eggers, Bull. U. S. Nat. Mus. 13: 62. 1879.

Glabrous or nearly so, annual. Stems simple and erect or more or less diffusely branched from the base, the branches 1–3 dm. long; leaves linear, oblong or oblong-lanceolate, 2–5 cm. long, acute or acuminate, narrowed into short petioles; calyx-lobes subulate or lanceolate-subulate; corolla white, twice or thrice as long as the calyx-lobes, its teeth broad, rounded, pubescent, the capsule about 2 mm. long.

Fields, banks and hillsides, Porto Rico, at lower and middle elevations; Mona; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Anegada:—Florida; Bermuda; West Indies; continental tropical America. IRON GRASS.

2. **Spermacoce riparia** C. & S. Linnaea 3: 355. 1828.

Perennial, branched, glabrous, erect or ascending, 2–6 dm. high. Leaves oblong to oblong-lanceolate or elliptic, 3–8 cm. long, acuminate, the base narrowed, the petioles about 8 mm. long or shorter; calyx-lobes ovate, acute; corolla little longer than the calyx-lobes; capsule glabrous, 1.5–2 mm. long. [*S. glabra* of Urban, not of Michaux.]

Hacienda Carmelita, near Cabo Rojo, Porto Rico, collected only by Sintenis:—Jamaica; Cuba; Hispaniola; continental tropical America.

Spermacoce hispida L. [*S. articularis* L. f.], an Old World species, was recorded by Krebs from St. Thomas, evidently in error.

Spermacoce radicans Aubl., also listed by Krebs from St. Thomas, is an unidentified species of French Guiana.

37. **MITRACARPUS** Zucc.; Schultes, Mant. 3: 210. 1827.

Annual or perennial herbs, or low shrubs, the stems and branches mostly 4-angled, the leaves opposite, the stipular sheath with several bristles, the small white flowers densely capitate. Calyx-teeth 4 or 5, the lateral ones nearly subulate, the others much smaller. Corolla salverform or funnelform, its 4 spreading lobes valvate. Stamens 4, the anthers oblong or linear. Ovary usually 2-celled; ovules 1 in each cavity; style-branches narrow. Capsule didymous, thin-walled, circumscissile. Seeds globose or oblong. [Greek, referring to the circumscissile capsule.] Thirty species or more of tropical regions, mostly American. Type species: *Mitracarpus scabrus* Zucc.

Shrubby, somewhat woody; leaves linear; perennials.

Leaves glabrous.

Leaves densely scabrous.

Plants herbaceous; annuals.

Leaves linear to linear-lanceolate.

Leaves oblong to elliptic.

1. *M. portoricensis*.

2. *M. Maxwelliae*.

3. *M. polycladus*.

4. *M. hirtus*.

1. **Mitracarpus portoricensis** Urban, Symb. Ant. 4: 609. 1911.

M. frigidus portoricensis Urban, Symb. Ant. 3: 387. 1903.

Shrubby, bushy-branched, 3–6 dm. high, glabrous, the slender branches 4-angulate or 4-angled. Leaves fascicled at the nodes, linear, dark green, acute, sessile, 3–6 cm. long, 1–3 mm. wide; stipular sheath about 4 mm. long, its bristles about as long; heads dense, globose, terminal and sometimes also in the upper axils, many-flowered, 1–2 cm. in diameter; lateral sepals linear-lanceolate, 2–3 mm. long; corolla bright white, about 5 mm. long, its ovate lobes shorter than the tube; capsule about 1 mm. long, circumscissile at about the middle. [*Borreria podocephala* of Stahl, not of de Candolle.]

Fields, sandy plains and hillsides in moist parts of the northern and western districts of Porto Rico, a beautiful low shrub. Endemic.

2. **Mitracarpus Maxwelliae** Britton & Wilson, sp. nov.

Perennial; stem minutely hispidulous, branched, 1–1.8 dm. high, the branches somewhat woody, striate and sharply 4-angled. Leaves linear or linear-lanceolate, densely scabrous, 1–3 cm. long, 2–5 mm. broad, sessile, acute at the apex; stipular sheath about 2 mm. long, the bristles a little longer; heads mostly terminal, dense, subglobose, 1–1.3 cm. in diameter; lateral sepals linear-lanceolate, 2.5–3 mm. long, acuminate at the apex, hispidulous; corolla not seen; capsule about 1.5 mm. long, circumscissile at about the middle; seeds ellipsoid, 1.2 mm. long, 0.8 mm. broad, brownish black.

Limestone hill, Salinas de Guanica, Porto Rico, (Britton & Boynton, 8319, March 8, 1925.) Endemic. Named in honor of Mrs. French Maxwell, of Ensenada, expert gardener.

3. **Mitracarpus polycladus** Urban, Symb. Ant. 3: 389. 1903.

Annual, erect, much branched from the base, glabrous or nearly so about 2.5 dm. high the slender branches 4-angled. Leaves linear to linear-lanceolate, sessile, sharply acute, 1.5–3.5 cm. long, 1–3 mm. wide; stipular sheath about 2

mm. long, its bristles a little longer; heads terminal, subglobose, 7–12 mm. in diameter, densely many-flowered; lateral sepals about 3 mm. long, linear-lanceolate, acuminate, ciliolate; corolla about 5 mm. long, its lobes ovate; capsule about 1.5 mm. long, circumscissile somewhat below the middle.

Coastal rocky thicket, Caño Gorda near Guanica, Porto Rico. Endemic.

4. **Mitracarpum hirtus** (L.) DC. Prodr. 4: 572. 1830.

Spermacoce hirta L. Sp. Pl. ed. 2, 148. 1762.

Annual; stem pilose-pubescent, branched, 1.5–4 dm. high, the branches 4-angled. Leaves oblong to elliptic, scabrous, 2–5 cm. long, sessile or very short-petioled, the apex acute or obtuse, the base narrowed; stipular sheath 2–3 mm. long, the bristles about as long; heads terminal and axillary, subglobose, many-flowered, 6–12 mm. in diameter; lateral sepals linear-lanceolate, about 2 mm. long; corolla about 2.5 mm. long; capsule shorter than the calyx, circumscissile near the middle.

Grassy places, near Río Piedras and Bayamon, Porto Rico, first detected by Professor E. E. Dale in 1923:—Jamaica; Cuba; St. Eustatius to Barbados; continental tropical America.

Hoffmannia Ghiesbreghtii Hemsl., Mexican, occasionally planted for ornament in Porto Rico gardens, forms simple angled stems about 1 m. high, the large entire obovate-elliptic leaves finely variegated above, the small flowers borne on the stems below the leaves, sometimes down to the base.

Anthocephalus Cadamba (Roxb.) Miquel, East Indian, was seen in the garden of Peter J. Kane, Río Piedras in 1925 as a tree about 16 m. high with a trunk 3 dm. in diameter; it had reached these dimensions in about six years from seed, a very rapid growth, but had not flowered; its leaves are broadly elliptic, 2–3 dm. long, acuminate, petioled; its orange flowers form dense heads 3–5 cm. in diameter, the fruits fleshy, confluent. We are indebted to Mr. J. H. Burkill, Director of the Singapore Botanic Garden, for the determination of this interesting tree. [*Nauclea Cadamba* Roxb.]

Portlandia grandiflora L., Jamaican, planted for ornament on St. Thomas, and St. Croix, is a large shrub with ovate pointed shining short-petioled leaves 8–15 cm. long, and showy white short-peduncled axillary flowers, the funnelform corolla 10–15 cm. long. It has been recorded as native in St. Thomas, but this is improbable. Seedlings were seen at the Trujillo Propagation Station in 1925.

Vangueria madagascariensis Gmelin, VOA-VANGA, of tropical Africa, occasionally planted for its fruit in Porto Rico and the Virgin Islands, is a tall shrub with ovate or ovate-lanceolate short-petioled leaves and panicked axillary flowers, the globose fruit about 3 cm. in diameter. [*Vavanga edulis* Vahl; *Vangueria edulis* Vahl.]

Warszewiczia coccinea (Vahl) Kl., listed by Krebs as found in St. Thomas, prior to 1851, is a tree of Trinidad and northern South America. It was recently introduced at the Agricultural Experiment Station, Mayaguez; it forms a small tree, with large obovate leaves, the small yellow flowers in nodding panicles, one of the calyx-lobes in each small cluster developed into a showy scarlet foliaceous appendix. [*Calycophyllum coccineum* DC.]

Mussaenda philippica A. Rich., of the Philippine Islands, in the collection at the Mayaguez Experiment Station, is a small tree, with thin elliptic petioled leaves, loosely corymbose yellow flowers about 3 cm. long, and large white elliptic petioled bracts.

Paederia erecta Roxb., a little known East Indian species, was listed by Krebs as found in St. Thomas prior to 1851.

Anisomeris fasciculata (Sw.) Schum., of the island Grenada, was also recorded from St. Thomas by Krebs, where it may perhaps have been planted. [*Chomelia fasciculata* Sw.]

Coutarea coccinea Grosourdy, is unknown to botanists of the present time.

Malanea macrophylla Bartl., included by Stahl in the Porto Rico flora inhabits the southern Lesser Antilles only.

Family 2. CAPRIFOLIACEAE Vent.

HONEYSUCKLE FAMILY.

Shrubs, trees, vines, or perennial herbs, with opposite leaves and perfect, mostly cymose flowers. Stipules none, or sometimes present. Calyx-tube adnate to the ovary, its limb 3-5-toothed or 3-5-lobed. Corolla gamopetalous, the limb 5-lobed, sometimes 2-lipped. Stamens 5 (rarely 4), inserted on the tube of the corolla and alternate with its lobes; anthers versatile. Ovary inferior, 1-6-celled; style slender; stigma capitate, or 2-5-lobed, the lobes stigmatic at the summit; ovules anatropous. Fruit a 1-6-celled berry, drupe, or capsule. Seeds oblong, globose, or angular; seed-coat membranous or crustaceous, embryo usually small, placed near the hilum; radicle terete; cotyledons ovate. About 10 genera and 260 species, mostly of the northern hemisphere.

1. **SAMBUCUS** [Tourn.] L. Sp. Pl. 269. 1753.

Shrubs or trees (or some species perennial herbs), with opposite pinnate leaves, serrate or lacinate leaflets, and small white or pinkish flowers in compound depressed or thyrsoïd cymes. Calyx-tube ovoid or turbinate, 3-5-toothed or 3-5-lobed. Corolla rotate or slightly campanulate, regular, 3-5-lobed. Stamens 5, inserted at the base of the corolla; filaments slender; anthers oblong. Ovary 3-5-celled; style short, 3-parted; ovules 1 in each cavity, pendulous. Drupe small, berry-like, containing 3-5, 1-seeded nutlets. Endosperm fleshy; embryo nearly as long as the seed. [Latin name of the elder.] About 25 species, of wide geographic distribution. Type species: *Sambucus niger* L.

1. **Sambucus Simpsoni** Rehder, Trees & Shrubs 2: 187. 1911.

S. intermedia insularis Schwerin, Mitt. Deutsch. Dendr. Ges. 18: 38. 1909.

A small tree 2-5 m. high, glabrous throughout, or the young leaves and inflorescence sparingly pubescent. Leaflets 3, 5 or 7, simple, or the lateral ones often 3-divided or 3-foliolate, 5-10 cm. long, lanceolate to ovate-lanceolate, irregularly serrate, acute or acuminate; cymes decompound, many-flowered, 12 cm. broad or less, peduncled, wider than long, [(?) *S. nigra* of Eggers, not of Linnaeus; *S. canadensis* of Krebs, of Bello and of Stahl, not of Linnaeus.]

Mountain sides at middle elevations, Porto Rico; planted in Porto Rico and Virgin Island gardens:—Florida to Louisiana; Cuba; Hispaniola; Saba to St. Vincent; Central America. Repeated observations of this plant in the West Indies have failed to find it fruiting; Florida specimens have black globose fruit 5 mm. in diameter. SAUCO. ELDER.

Lonicera japonica Thunb., MADRE-SELVA, JAPANESE HONEYSUCKLE, Asiatic, planted for ornament in Porto Rico and the Virgin Islands, is a pu-

bescent, trailing or climbing vine, with opposite ovate short-petioled, entire leaves 2.5–7 cm. long, the flowers in short-peduncled pairs in the upper axils; the 2-lipped, pubescent corolla is white to pink or yellow, its slender tube about 2 cm. long; the fruit is a black berry 6–8 mm. in diameter.

Lonicera Caprifolium L., ITALIAN HONEYSUCKLE, European, recorded by Eggers as cultivated in the Virgin Islands, is a high-climbing, glabrous vine, the upper pairs of leaves connate-perfoliate, the glabrous, nearly white, 2-lipped flowers in sessile terminal capitate clusters, the berries red.

Lonicera flava Sims, YELLOW HONEYSUCKLE, of the southeastern United States, was recorded by Krebs as grown in St. Thomas prior to 1851.

Abelia grandiflora Rehder, of horticultural origin, was experimentally grown at the Trujillo Plant Propagation Station, Porto Rico, in 1925. It is a shrub with ovate leaves 2–3 cm. long, the funnel-form pinkish white flowers about 2 cm. long.

Order 8. VALERIANALES.

Herbs, the corolla gamopetalous. Stamens mostly fewer than the corolla-lobes; anthers separate. Ovary inferior, 1-celled with 1 pendulous ovule, or 3-celled with 2 of the cavities without ovules.

Family 1. VALERIANACEAE Batsch.

VALERIAN FAMILY.

Herbs, with opposite leaves, no stipules, and usually small flowers, in corymbed paniced or capitate cymes. Calyx-tube adnate to the ovary, its limb inconspicuous or none in flower, often becoming prominent in fruit. Corolla epigynous, somewhat irregular, its tube narrowed, and sometimes gibbous or spurred at the base, its limb spreading, mostly 5-lobed. Stamens 1–4, inserted on the corolla and alternate with its lobes. Ovary inferior, 1–3-celled, one of the cavities containing a single anatropous ovule, the others empty. Fruit indehiscent, dry, containing a single suspended seed. Endosperm little or none; embryo straight; cotyledons oblong. About 9 genera and 275 species, of wide distribution.

1. VALERIANA [Tourn.] L. Sp. Pl. 31. 1753.

Perennial strong-smelling herbs, erect, or rarely climbing, the cymose flowers paniculate in our species. Calyx-limb of 5–15 plumose teeth, short and inrolled in flower, but elongated, rolled outward and conspicuous in fruit. Corolla funnel-form or tubular, usually more or less gibbous at the base, the limb nearly equally 5-lobed. Stamens commonly 3. Style entire, or minutely 2–3-lobed at the summit. Fruit compressed, 1-nerved on the back, 3-nerved on the front. [Name Middle Latin, from *valere*, to be strong.] About 175 species, mostly in the north temperate zone and the Andes. Type species: *Valeriana pyrenaica* L.

1. *Valeriana scandens* L. Sp. Pl. ed. 2, 47. 1762.

Valeriana scandens ternata Kuntze, Rev. Gen. Pl. 303. 1891.

A slender glabrous branching herbaceous vine, up to 2 m. long or longer. Leaves ternately divided, or sometimes simple, slender-petioled, the segments

ovate, membranous, entire or repand, 2–6 cm. long, the apex acuminate, the base mostly rounded or subcordate; panicles axillary and terminal, usually many-flowered, long-peduncled, 4–10 cm. broad, their very slender branches flexuous; flowers white, sessile, very small, only about 1.5 mm. long; bractlets narrow, 1–2 mm. long; fruit narrowly ovate, strongly nerved, about 3 mm. long.

Thickets, forests and hillsides, Porto Rico, at middle or higher elevations in moist parts of the central and western districts:—Florida; Cuba; Hispaniola; continental tropical America.

Order 9. CAMPANULALES.

Herbs, rarely trees or shrubs, the corolla gamopetalous, or petals sometimes separate in Cucurbitaceae. Stamens as many as the corolla-lobes (fewer in the Cucurbitaceae); anthers mostly united (except in Ambrosiaceae and many Cucurbitaceae). Ovary inferior.

Flowers not in involucrate heads: juice mostly milky.

Endosperm none; flowers regular, monoecious or dioecious; our species vines.

Endosperm present, fleshy; flowers perfect, irregular.

Stigma not indusiate.

Flowers regular.

Flowers irregular.

Stigma indusiate.

Flowers in involucrate heads.

Flowers all expanded into rays (ligulate); juice milky.

Flowers all tubular, or the outer expanded into rays; juice very rarely milky.

Stamens distinct, or nearly so.

Stamens united by their anthers into a tube around the style.

Fam. 1. CUCURBITACEAE.

Fam. 2. CAMPANULACEAE.

Fam. 3. LOBELIACEAE.

Fam. 4. GOODENIACEAE.

Fam. 5. CICHORIACEAE.

Fam. 6. AMBROSIIACEAE.

Fam. 7. CARDUACEAE.

Family 1. CUCURBITACEAE B. Juss.

GOURD FAMILY.

Herbaceous vines, usually with tendrils. Leaves alternate, petioled, generally palmately lobed or dissected. Flowers monoecious or dioecious. Calyx-tube adnate to the ovary, its limb usually 5-lobed, the lobes imbricated. Petals usually 5, inserted on the limb of the calyx, separate, or united into a gamopetalous corolla. Stamens mostly 3 (sometimes 1), 2 of them with 2-celled anthers, the other with a 1-celled anther; filaments short, often monadelphous. Ovary 1–3-celled; style terminal, simple, or lobed; ovules anatropous. Fruit a pepo, indehiscent, or rarely dehiscent at the summit, or bursting irregularly; or sometimes dry and membranous. Seeds usually flat; endosperm none. About 90 genera and 700 species, mainly of tropical regions.

A. Ovules horizontal.

1. Anther-sacs flexuous.

a. Corolla 5-parted or of 5 separate petals.

Staminate calyx-tube elongated.

Staminate calyx-tube short.

Stamens borne at the calyx-mouth.

Stamens borne on the calyx-tube.

Staminate flowers racemose.

Staminate flowers fascicled or solitary.

Anther-connective appendaged; tendrils simple.

Anther-connective not appendaged; tendrils mostly 2–3-cleft.

b. Corolla 5-lobed to about the middle.

Filaments connate; stigma 3-lobed.

Filaments distinct; stigmas 3–5, each 2-lobed.

2. Anther-sacs not flexuous, straight or curved.

Style-base surrounded by an annular disk.

Style-base without a disk.

Stamens 3.

1. *Cucurbita*.

2. *Momordica*.

3. *Luffa*.

4. *Cucumis*.

5. *Citrullus*.

6. *Coccinia*.

7. *Pepo*.

8. *Melothria*.

9. *Corallocarpus*.

- Stamens 2.
 B. Ovules not horizontal.
 Ovules ascending; flowers monoecious or dioecious.
 Ovules pendulous.
 Ovary 1-celled; flowers monoecious.
 Ovary 3-celled; flowers dioecious.

10. *Anguria*.
 11. *Cayaponia*.
 12. *Sechium*.
 13. *Fevillea*.

1. **CUCURBITA** [Tourn.] L. Sp. Pl. 1010. 1753.

A long stout climbing annual vine, with broad orbicular angulate or lobed leaves, the large white monoecious flowers solitary. Staminate flowers long-peduncled, the nearly funnelform calyx 5-lobed, the corolla of 5 distinct obovate spreading petals, the 3 distinct stamens borne on the calyx-tube, the anther-sacs flexuous. Pistillate flowers peduncled, the calyx cup-shaped, 5-lobed, the corolla similar to that of the staminate flowers, the ovary ovoid to cylindric, the style short and thick, the 3 stigmas 2-lobed, the ovules horizontal. Fruit large, indehiscent, the rind hard. Seeds white, obovate, margined. [Latin, name of the gourd.] A monotypic genus.

1. **Cucurbita Lageneria** L. Sp. Pl. 1010. 1753.

- Lageneria vulgaris* Ser. Mem. Soc. Phys. Geneve 3¹: 25. 1825.
Lageneria Lageneria Cockerell, Bull. Torr. Club 19: 95. 1892.

Stem up to 6 m. long or longer, angular, pubescent, at least when young. Leaf-blades finely short-pubescent, reniform-cordate, 0.8–4 dm. broad, irregularly denticulate, sometimes 3-lobed; petioles rather stout, about as long as the blades, or shorter, 2-glandular near or at the base of the blade; peduncle of the staminate flower mostly short; petals crisped, 3–4 cm. long, pubescent near the base; staminate flowers with a pubescent calyx 2–3 cm. long, its lobes narrowly triangular, the filaments 3–4 mm. long, the anthers about 9 mm. long; pistillate flowers with a calyx-tube only about 3 mm. long, the 3 staminodia very small; fruit various in shape, whitish or yellowish, glabrous, 1–3 dm. long.

Occasionally spontaneous after cultivation in Porto Rico; Vieques; St. Croix; St. Thomas; Tortola:—Widely distributed for its fruit in the West Indies and continental tropical America. Native of the Old World tropics. MARIMBO, CANDUNGO AMARGO. CARACHO. GOURD.

2. **MOMORDICA** L. Sp. Pl. 1009. 1753.

Herbaceous, climbing or prostrate vines, with simple or forked tendrils, and dioecious or monoecious mostly yellow flowers, the staminate solitary or clustered, the pistillate solitary. Staminate flowers with a 5-lobed calyx, a nearly rotate, 5-parted corolla, and usually 3 stamens with short distinct filaments, borne at the calyx-mouth, the anther-sacs flexuous. Pistillate flowers with calyx and corolla like those of the staminate, a 1-celled ovary with 3-placentae, the numerous ovules horizontal, the style slender, the stigmas 3. Fruit ovoid to cylindric, 3-valved or indehiscent. [Latin, of uncertain application.] About 25 species, of the Old World tropics. Type species: *Momordica Balsamina* L.

1. **Momordica Charantia** L. Sp. Pl. 1009. 1753.

- Momordica zeylanica* Mill. Gard. Dict. ed. 8. 1768.
Momordica Charantia abbreviata Ser. in DC. Prodr. 3: 311. 1828.

Stem slender, more or less pubescent, 1–8 m. long, with simple filiform tendrils opposite the leaves. Leaves thin, reniform or suborbicular in outline, 4–12 cm. broad, deeply pedately 5–7-lobed, glabrate or pubescent, the lobes dentate, acute or obtuse, the slender petioles 3–6 cm. long; peduncles of the staminate

flowers with an ovate entire cordate bract at or below the middle; sepals oval or ovate, 3–4.5 mm. long; corolla-segments obtuse or emarginate, 1.5–2 cm. long, yellow; fruit yellow, tubercled, 2–12 cm. long; seeds flat, 12–16 mm. long.

Fields, hedges, thickets and waste grounds at lower elevations, Porto Rico; Vieques; Culebra; St. Croix; St. Thomas; St. Jan; Tortola:—southern United States; West Indies; continental tropical America and Old World tropics. Immature fruits are sometimes eaten. Probably native of the Old World. CUNDEAMOR. WILD BALSAM APPLE.

Momordica Balsamina L., BALSAM APPLE, presumably of Old World origin, is occasionally cultivated in Porto Rico and the Virgin Islands for its fruit. It is similar to the preceding species, but the peduncle of the staminate flowers bears a suborbicular dentate bract at the apex and the fruit is orange-red, tuberculate-crested, 3–6 cm. long.

Momordica cochinchinensis Spreng., East Indian, grown at the St. Croix Experiment Station in 1925, has 3-lobed leaves, a large yellowish white corolla 7–10 cm. broad, the ovoid aculeate fruit 12–15 cm. long.

3. **LUFFA** Adans. Fam. Pl. 2: 138. 1763.

Annual climbing monoecious herbaceous vines, with broad leaves and branched tendrils, the staminate flowers racemose, the pistillate solitary. Staminate flowers with a 5-lobed calyx, 5 distinct petals and 3 (rarely 4 or 5) distinct stamens borne on the calyx-tube, the anther sacs linear, flexuous. Pistillate flowers with calyx-lobes and corolla similar to those of the staminate, 3 (rarely 4 or 5) staminodia, the ovary elongated, the numerous ovules horizontal, the style columnar, the stigma 3-lobed. Fruit dry, 3-celled, fibrous within, cylindric or oblong, operculate at the apex, many-seeded, the style persistent. [Name Arabic.] About 6 species, of tropical regions. Type species: *Momordica Luffa* L.

Ovary cylindric; fruit ribless; seeds smooth, winged.

Ovary claviform; fruit sharply 10-ribbed; seeds rugose, wingless.

1. *L. cylindrica*.

2. *L. acutangula*.

1. **Luffa cylindrica** (L.) Roemer, Syn. Pep. 63. 1846.

(?) *Momordica Luffa* L. Sp. Pl. 1009. 1753.

Momordica cylindrica L. Sp. Pl. 1009. 1753.

Stem rather slender, glabrous, 5-angled, 4–6 m. long or longer. Leaf-blades orbicular-ovate in outline, cordate, up to 2.5 dm. broad, scabrate, dark green, lobed and sinuate-denticulate, the lobes triangular or triangular-lanceolate, acute, the basal sinus rounded; petioles 12 cm. long or shorter; peduncle of the staminate flowers 10–15 cm. long, the raceme 10–20-flowered, the pedicels about 2 cm. long or shorter, jointed near the apex; calyx short, broadly campanulate, its lanceolate lobes longer than the tube; petals bright yellow, oblong-cuneate, rounded, 2–3 cm. long; peduncle of the pistillate flower 2–10 cm. long; fruit cylindric or fusiform, ribless, 1–3 dm. long; seeds smooth, narrowly winged. [? *M. operculata* of West; *L. acutangula* of Bello, not of Roxburgh.]

Occasionally spontaneous after cultivation in Porto Rico; St. Croix; St. Thomas:—widely distributed in the West Indies and continental tropical America. Native of the Old World tropics. ESPONJA. SPONGE CUCUMBER. VEGETABLE SPONGE.

2. **Luffa acutangula** (L.) Roxb. Hort. Beng. 70. 1814.

Cucumis acutangula L. Sp. Pl. 1011. 1753.

Stem, leaves and flowers similar to those of the preceding species, the leaves paler green, the petals light yellow. Fruit claviform, 10-ribbed; seeds wingless.

Occasionally spontaneous after cultivation in Porto Rico, erroneously recorded from St. Thomas:—widely distributed in tropical America. Native of the Old World tropics. Young fruits of this and of the preceding species are sometimes eaten.

4. **CUCUMIS** L. Sp. Pl. 1011. 1753.

Mostly prostrate monoecious scabrous or hispid vines, with lobed or angular leaves, simple tendrils and yellow fascicled or solitary flowers. Calyx-limb with 5 subulate separated lobes. Corolla 5-parted, its segments acute. Staminate flowers usually fascicled, with 3 distinct stamens borne on the calyx-tube, the linear anther-sacs flexuous, the connective with a 2-lobed appendage; pistillodium gland-like. Pistillate flowers usually solitary; staminodia 3; ovary globose or oblong; ovules many, horizontal; style short, not lobed. Fruit fleshy, small or large, smooth or roughened, mostly indehiscent. [Latin, cucumber.] About 30 species, natives of tropical regions. Type species: *Cucumis sativus* L.

1. **Cucumis Anguria** L. Sp. Pl. 1011. 1753.

Annual, nearly prostrate, hispid, branched, rather slender, 0.5–2 m. long. Leaf-blades broadly ovate or suborbicular in outline, 5–10 cm. long, deeply 3-lobed or 5-lobed, scabrous, hispidulous on both sides, the base subtruncate, the middle lobe obovate, the lateral ones various, more or less oblique, the sinuses rounded; petioles slender, hispid, about as long as the blades or longer; staminate flowers fascicled or sometimes solitary, the pistillate solitary, long-peduncled; calyx campanulate, about 6 mm. long, its teeth subulate; corolla about 10 mm. broad, its segments ovate; staminate flowers with glabrous stamens, the appendage of the connective dilated; staminodia of the pistillate flower lingulate, 1–2 mm. long; fruit ellipsoid, prickly, yellow, 4–7 cm. long.

Fields, banks, thickets and waste grounds, Porto Rico; Mona; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Anegada:—Florida; Texas; West Indies (except Bahamas); continental tropical America. CONCOMBRE. PEPINETO. ANGURIA.

Cucumis Melo L., MELON, MELÓN, native of the Old World tropics, cultivated in several races for its fruit in Porto Rico and the Virgin Islands, is an annual hirsute vine, with broad lobed leaves, the corolla about 2 cm. long, the large fruit smooth, various in the many races, the seeds yellowish.

Cucumis sativus L., CUCUMBER, COHOMBRO, supposed to be of East Indian origin, planted for its fruit in Porto Rico and the Virgin Islands, is hirsute, annual, with angularly lobed leaves, the corolla 2–3 cm. broad, the oblong fruit more or less tubercled or nearly smooth.

5. **CITRULLUS** Forst. Fl. Aegypt. Arab. 167. 1775.

Trailing vines, mostly annuals, with branched tendrils and deeply lobed or dissected leaves, the monoecious flowers mostly solitary. Calyx campanulate, 5-lobed. Corolla 5-parted, its segments obtuse. Staminate flowers with 3 stamens borne near the base of the calyx-tube, the short filaments distinct, the anther-sacs flexuous, the connective unappendaged. Pistillate flowers with 3 short staminodia, the ovary ovoid, the many ovules horizontal, the style short, the stigmas reniform. Fruit oblong or globose, indehiscent, many-seeded. [Diminutive of Citrus.] A few species, natives of the Old World. Type species: *Citrullus Battich* Forst.

1. **Citrullus Citrullus** (L.) Karst. Deutsche Fl. 889. 1882.

Cucurbita Citrullus L. Sp. Pl. 1010. 1753.

Cucumis Citrullus Ser. in DC. Prodr. 3: 301. 1828.

Citrullus vulgaris Schrad. Linnaea 12: 412. 1838.

Annual, prostrate, villous, 1–2 m. long. Leaf-blades ovate in outline, sparingly pubescent or glabrate, 7–20 cm. long, deeply pinnately lobed, or pinnatifid, the terminal lobe acute, the lateral ones rounded; petioles villous, mostly shorter than the blades; peduncle of the staminate flowers longer than the petioles; calyx villous, about 1 cm. long, its lobes lanceolate; corolla 2–3 cm. broad, its segments ovate-oblong, veiny; staminate flower with glabrous filaments; staminodia of the pistillate flower 1–2 mm. long, villous at the base; fruit various, globose to ellipsoid, smooth, watery, sweet, in cultivated races very large.

Occasionally spontaneous after cultivation for its fruit in Porto Rico and the Virgin Islands. Widely cultivated in many races in temperate and tropical regions. Native of tropical Africa. **PATILLA.** **SANDIA.** **WATER MELON.**

6. **COCCINIA** W. & A. Prodr. Fl. Ind. 1: 347. 1834.

Mostly perennial dioecious vines, the leaves angulate or lobed, the tendrils simple or rarely 2-cleft, the large flowers white or yellowish. Calyx turbinate or campanulate, 5-lobed. Corolla campanulate, 5-lobed. Staminate flowers solitary or racemose; stamens 3, the filaments connate; the anther-sacs flexuous, coherent, the connective narrow. Pistillate flowers solitary; staminodia 3; ovary oblong to linear; style slender; stigma 3-lobed; ovules many; horizontal. Fruit many-seeded, indehiscent. [Greek, scarlet.] About a dozen species, natives of the Old World tropics. Type species: *Coccinia indica* W. & A.

1. **Coccinia cordifolia** (L.) Cogn. in DC. Mon. Phan. 3: 529. 1881.

Bryonia cordifolia L. Sp. Pl. 1012. 1753.

Coccinia indica W. & A. Prodr. Fl. Ind. 1: 347. 1834.

A slender glabrous vine about 1 m. long or longer, climbing or sometimes prostrate. Leaf-blades orbiculate-ovate, cordate, 4–10 cm. long, angulately 5-lobed, deep green above, paler beneath, 5-nerved; petioles 1–5 cm. long; calyx-tube campanulate, about 5 mm. long, its subulate reflexed lobes 3–4 mm. long; corolla about 3 cm. long, white, glabrous without, villous within; staminate flowers long-peduncled, with a glabrous stamen-column 2–3 mm. long, the coherent anthers about 3 mm. long; pistillate flower short-peduncled, the staminodia subulate; fruit obovoid or oblong, scarlet, smooth, 4–5 cm. long; seeds short-papillose.

Thickets and valleys, escaped from cultivation, St. Croix; St. Thomas;—Guatemala. Native of the Old World tropics.

7. **PEPO** [Tourn.] Mill. Gard. Dict. Abr. ed. 4. 1754.

Rough prostrate vines, rooting at the nodes, with broad usually lobed leaves, branched tendrils and large yellow monoecious flowers, the staminate solitary or fascicled, the pistillate solitary. Calyx campanulate, 5-lobed. Corolla campanulate, 5-lobed to about the middle. Staminate flowers with 3 distinct stamens, the anther-sacs flexuous. Pistillate flowers with 3 triangular staminodia, the ovary oblong, the many ovules horizontal, the style short and thick, the 3–5 stigmas each 2-lobed. Fruit large, fleshy, indehiscent, the rind thick. [From the Greek name of some large fruit.] About 10 species, natives of America, Asia and Africa. Type species: *Cucurbita Pepo* L.

1. **Pepo moschata** (Duch.) Britton, Mem. Brooklyn Bot. Gard. 1: 96. 1918.

Cucurbita moschata Duch.; Poir. Dict. Sci. Nat. 11: 234. 1818.

Stem rather stout, about 2 m. long or longer. Leaf-blades reniform-orbicular, 1–3 dm. broad, softly pubescent, often white-blotched, denticulate, some-

times lobed; petioles about as long as the blades or longer; calyx-tube short, its lobes 2–3 cm. long, often dilated above; corolla 6–8 cm. long; fruit various; seeds white. [*Cucurbita Pepo* of Stahl, of Eggers and of Cook and Collins, not of Linnaeus.]

Spontaneous after cultivation, Porto Rico; St. Croix; St. Thomas:—Widely distributed in tropical regions. Native of the Old World. CALABAZA. SQUASH.

Pepo ficifolia (Bouché) Britton [*Cucurbita ficifolia* Bouché], recorded by Millspaugh as escaped from cultivation on St. Croix, is a perennial Asiatic species, with suborbicular reniform 5-lobed leaves, the fruit 2–3 dm. thick, the seeds black.

8. **MELOTHRIA** L. Sp. Pl. 35. 1753.

Slender vines, with simple or rarely bifid tendrils, thin leaves, and small white or yellow, monoecious flowers, the staminate clustered, the pistillate often solitary. Calyx campanulate, 5-toothed. Corolla campanulate, deeply 5-parted. Stamens 3 in the staminate flowers, the anthers distinct or slightly united, their sacs not flexuous, the pistil wanting or rudimentary. Fertile flowers with 1 pistil; ovary ovoid; placentae 3; ovules numerous, horizontal; the style short, its base with an annular disk; stigmas 3, linear. Fruit small, berry-like, pulpy. [From the Greek for some vine, probably *Bryonia cretica*.] About 60 species, natives of warm and tropical regions. Type species: *Melothria pendula* L. The plants are known as PEPINILLO in Porto Rico.

1. **Melothria guadalupensis** (Spreng.) Cogn. in DC. Mon. Phan. 3: 580. 1881.

Bryonia guadalupensis Spreng. Syst. 3: 15. 1826.

Melothria fluminensis Gardn. in Hook. Journ. Bot. 1: 173. 1842.

Melothria pendula Meyer, Prim. Fl. Esseq. 279. 1818. Not L. 1753.

Melothria pervaga Griseb. Fl. Br. W. I. 289. 1860.

A slender glabrous vine, sometimes 2 m. long, climbing by filiform tendrils. Leaves various, ovate, or ovate-lanceolate in outline, 3–7 cm. long, scabrous, repand or 3–5-lobed with the middle lobe often longer than the lateral ones, acute or acuminate at the apex, deeply cordate at the base; petioles slender, 1–4 cm. long; staminate racemes few-flowered, peduncled; peduncle of the pistillate flower 2–4 cm. long; calyx-teeth subulate, minute; corolla short-villous, about 4 mm. broad, its lobes obtuse; fruit ovoid, 1–1.5 cm. long, red or purple. [*M. pendula* of Krebs.]

Thickets, at low elevations, Porto Rico; St. Croix; St. Thomas; St. Jan; Tortola:—West Indies; continental tropical America.

9. **CORALLOCARPUS** Welw.; Hook. f.; Benth. & Hook. Gen. Pl. 1: 831. 1867.

Scabrous or tomentose vines, prostrate or climbing, with broad, entire or lobed leaves, simple tendrils and the small monoecious flowers fascicled or the pistillate solitary. Calyx campanulate, 5-lobed. Corolla 5-parted. Staminate flowers with 3 distinct stamens borne on the calyx-tube, the filaments short, the anther-sacs straight. Pistillate flowers with an ovoid beaked ovary, the few ovules horizontal, the style straight, the stigma mostly 3-lobed; staminodia none. Fruit fleshy, ovoid or ellipsoid, operculate. [Greek, coral fruit.] About 15 species, all but the following one natives of the Old World tropics. Type species: *Aechmandra epigaea* Arn.

1. **Corallocarpus emetocatharticus** (Gros.) Cogn. Bull. Soc. Bot. Belg. **30**: 279. 1891.

Doyerea emetocathartica Gros. Med. Bot. Criollo **2**: 338. 1864.

Anguria glomerata Eggers, Bull. U. S. Nat. Mus. **13**: 55. 1879.

Corallocarpus glomeratus Cogn. in DC. Mon. Phan. **3**: 658. 1881.

Stem stout, fleshy, glabrous, up to 6 m. long, sometimes 2.5 cm. thick, bent at the nodes, the young branches short-tomentose. Leaf-blades suborbicular or broadly ovate, 5–10 cm. broad, denticulate, lobed or entire, green and sparingly pubescent, or glabrous above, pale and densely tomentulose beneath, the lobes obtuse; petioles 1–3 cm. long; flowers densely fascicled, pale yellow, sessile; calyx-tube only about 1 mm. long, the lobes triangular; corolla short-pilose, 2–3 mm. long, its lobes ovate-oblong; fruit ovoid, 10–12 mm. long, several-seeded, yellowish, greenish-banded.

Thickets at low elevations in the dry southern districts and at Cabeza San Juan, Porto Rico; Culebra; Vieques; St. Croix; St. Thomas:—Guadeloupe; Trinidad; Margarita; Mexico to Venezuela.

10. **ANGURIA** Jacq. Enum. 9, 31. 1760.

Climbing vines, with slender simple tendrils, the leaves various, the dioecious or monoecious flowers mostly small, the staminate clustered at the end of a long peduncle, the calyx and corolla of staminate and pistillate flowers similar. Calyx with an elongated, more or less swollen tube and a 5-cleft or 5-toothed limb. Corolla deeply 5-parted, rotate. Staminate flowers with 2 included stamens, the filaments short, the anther-sacs straight, narrow, the connective appendaged. Pistillate flowers solitary or few, short-peduncled, with 2 staminodia, an ovoid ovary, a slender 2-cleft style, the stigmas 2-cleft, the ovules horizontal. Fruit many-seeded, ovoid or oblong. [Greek, similar to water melons.] Species 40 or 50, all American, rare in Porto Rico. Type species: *Anguria pedata* Jacq.

Leaves 3-foliolate or 5-foliolate.

Leaflets 3, entire or repand; flowers dioecious.

Leaflets entire or remotely denticulate; fruit beaked, 3–4 cm. long.

Leaflets sinuate-repand; fruit beakless, about 2 cm. long.

Leaflets 5, or 3, with the lateral ones deeply 2-lobed or sinuate; flowers monoecious.

Leaves 3–7-lobed.

Connective-appendage glabrous.

Connective-appendage villous or papillose.

1. *A. trifoliata*.

2. *A. Cookiana*.

3. *A. pedata*.

4. *A. Ottoniana*.

5. *A. trilobata*.

1. **Anguria trifoliata** L. Sp. Pl. ed. 2, 1376. 1763.

Stems rather stout. Leaves trifoliolate; petioles 1–4 cm. long; leaflets ovate or oblong-lanceolate, entire or remotely denticulate, glabrous, 5–10 cm. long, the lateral ones very oblique, the apex mostly acute, the petiolules 4–10 mm. long; petioles 1–4 cm. long, glabrous or sparingly pubescent; flowers dioecious; peduncle of the staminate raceme glabrous, 15–25 cm. long, the raceme 16–20-flowered, the pedicels 5–25 mm. long; calyx of the staminate flowers about 5 mm. long, the corolla-segments about 10 mm. long; pistillate flowers 2–4, on a peduncle 2–4 cm. long, the calyx cylindric, about 12 mm. long, the corolla-segments 6–7 mm. long; fruit ovoid-oblong, 3–4 cm. long, smooth, short-beaked.

Porto Rico, collected by Plée (according to Cogniaux):—Hispaniola. A little-known species.

2. **Anguria Cookiana** Britton, sp. nov.

(?) *Anguria Plumieriana trifoliolata* Cogn. Jahrb. Bot. Gart. Berlin **4**: 284. 1886.

Glabrous; dioecious (?); stem slender, elongated. Leaves 3-foliolate; leaflets lanceolate or oblong-lanceolate, 8–10 cm. long, repand-sinuate and remotely

denticulate, rather long-acuminate, the lateral ones very oblique, their flat petiolules about 5 mm. long; fruit ellipsoid, 2 cm. long, 1.5 cm. thick, beakless, its peduncle 2 cm. long.

Peñon, Coamo Road (*Cook and Collins 627*); in fruit Nov. 20, 1899. Endemic.

3. *Anguria pedata* (L.) Jacq. Enum. 31. 1760.

Cucumis pedatus L. Syst. ed. 10, 1279. 1759.

Anguria affinis Schl. Linnaea 24: 760. 1851.

Anguria pedata affinis Cogn. Mem. Cour. Acad. Belg. 28: 10. 1877.

A glabrous monoecious vine, trailing or climbing, 3 m. long or longer, the root elongated, the stem grooved, somewhat woody below. Leaves reniform-orbicular, usually divided into 3 or 5 short-stalked leaflets, the 2 lateral ones again 2-3-divided, the segments lanceolate or oblong, acute or obtuse, few-toothed or entire; peduncle of the staminate raceme slender, about as long as the leaves; staminate racemes 5-16-flowered; pedicels 5-16 mm. long; calyx ovoid, 5-7 mm. long, its lobes ovate or lanceolate, acute, one-third to one-half as long as the tube; pistillate flowers solitary or in pairs, the peduncle short; petals orange, 1-1.5 cm. long; fruit ovoid, short-beaked, about 3 cm. long.

Thickets in moist districts, Porto Rico:—Bahamas; Cuba; Hispaniola.

4. *Anguria Ottoniana* Schl. Linnaea 24: 758. 1851.

Apparently dioecious; stem slender, glabrous, up to 3 m. long or longer. Leaf-blades glabrous, suborbicular in outline or broader than long, 6-12 cm. wide, palmately 5-7-lobed, the lobes acute or obtuse, repand or entire, the base subcordate; raceme of staminate flowers slender-peduncled, the peduncle 8-16 cm. long, 4-8-flowered, the pedicels 5-10 mm. long; calyx ovoid, about 8 mm. long, its triangular teeth acute; corolla-segments oblong, acute, 12-15 mm. long.

Porto Rico, collected by Plée (according to Cogniaux):—Cuba; Tobago; Venezuela.

5. *Anguria trilobata* (L.) Jacq. Enum. 31. 1760.

Cucumis trilobatus L. Syst. ed. 10, 1279. 1759.

Anguria Plumieriana Schl. Linnaea 24: 709. 1851.

Stem slender, glabrous, elongated. Leaf-blades 8-20 cm. long, 3-lobed, the lobes ovate to lanceolate, entire, acuminate, glabrous on both sides or somewhat pubescent beneath; petioles shorter than the blades; peduncle of the staminate raceme 1-2 dm. long, that of the pistillate flowers 2-5 cm. long; staminate flowers 5-20, on pedicels 2-20 mm. long, the calyx subcylindric, 8-12 mm. long, with triangular teeth; corolla-segments villous or papillose, 1-2 cm. long; pistillate flowers 1-3; the peduncle short; fruit oblong, 3-5 cm. long, short-beaked.

Woodlands, thickets and river-banks in moist or wet districts, Porto Rico; St. Croix (according to Cogniaux):—Martinique; St. Vincent; Trinidad; Colombia.

11. **CAYAPONIA** Manso, Enum. Subst. Bras. 31. 1836.

Climbing herbaceous vines, with entire toothed lobed or palmately divided leaves, simple or divided tendrils, and rather large, monoecious or dioecious, mostly paniced or racemose flowers. Calyx campanulate, its limb 5-cleft. Corolla 5-parted, rotate or subcampanulate. Staminate flowers with 3 distinct stamens, the anther-sacs flexuous, the rudimentary ovary 3-lobed. Pistillate flowers often with 3 rudimentary stamens; ovary 3-celled; ovules 1 or 2 in each cavity, ascending; style 3-cleft, the 3 stigmas dilated. Fruit rather small, slightly fleshy, mostly 3-seeded. [Brazilian name.] About 60 species of tropical and

subtropical America, one in tropical Africa. Type species: *Cayaponia diffusa* Manso. The vines are called COLOQUINTILLA in Porto Rico.

Calyx 3–4 mm. long, its teeth triangular; corolla-lobes 3–5 mm. long. 1. *C. racemosa*.
Calyx 6–9 mm. long, its teeth lanceolate; corolla-lobes 12–15 mm. long. 2. *C. americana*.

1. ***Cayaponia racemosa*** (Sw.) Cogn. in DC. Mon. Phan. 3: 768. 1881.

Bryonia racemosa Sw. Prodr. 116. 1788.

Cionandra racemosa Griseb. Fl. Br. W. I. 286. 1860.

Trianospermum racemosum Griseb. Cat. Pl. Cub. 112. 1866.

Cayaponia racemosa subintegrifolia, laevis, Plumieri, and scaberrima Cogn. in DC. Mon. Phan. 3: 768, 769. 1881.

A somewhat woody, often high-climbing vine, up to 7 m. long, the stem and branches glabrous. Leaves ovate-orbicular in outline, 6–13 cm. long, variously lobed, or the upper entire or nearly so, acute or acuminate at the apex, cordate or subreniform at the base, scabrous above, puberulent or hispidulous beneath, the rather slender petioles 2–7 cm. long; flowers racemose or racemose-paniculate, distant; pedicels 3–6 mm. long; calyx campanulate, 3–4 mm. long, its teeth triangular-ovate, small; corolla about 1 cm. broad; fruit oblong, red, 1–2 cm. long.

Thickets, woods and forests, Porto Rico, at lower and middle elevations in moist and wet districts; Tortola:—Florida; Bahamas; Jamaica; Cuba; Hispaniola; Tobago; Trinidad; continental tropical America.

2. ***Cayaponia americana*** (Lam.) Cogn. in DC. Mon. Phan. 3: 785. 1881.

Bryonia americana Lam. Encycl. 1: 498. 1785.

Bryonia ficifolia Desc. Fl. Ant. 6: 39. 1828. Not Lam. 1785.

Trianospermum graciliflorum Griseb. Cat. Pl. Cub. 112. 1866.

Trianosperma ficifolium Eggers Bull. U. S. Nat. Mus. 13: 55. 1879.

Cionandra graciliflora Griseb. Fl. Br. W. I. 287. 1860.

Cayaponia americana subintegrifolia, vulgaris and angustiloba Cogn. in DC. Mon. Phan. 3: 786, 787. 1881.

A long vine, glabrous, similar to *C. racemosa*, the leaves various, 3–5-lobed or nearly entire, the petioles 2–7 cm. long. Flowers few, clustered in short racemes or panicles, or sometimes solitary; pedicels 2–6 mm. long; calyx campanulate-cylindric, 6–9 mm. long, its teeth lanceolate, 2–4 mm. long; corolla 2–3 cm. broad; fruit oblong to ellipsoid, 14–18 mm. long.

Forests and thickets, Porto Rico, at lower and middle elevations in moist and wet districts; Vieques; Culebra; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Cuba; Hispaniola; St. Barts to St. Vincent.

12. **SECHIUM** P. Br.; Sw. Fl. Ind. Occ. 2: 1150. 1800.

A high-climbing perennial hispid vine, with broad lobed or angulate leaves, branched tendrils and small monoecious white flowers, the staminate racemose, the pistillate solitary or 2 together. Calyx hemispheric, 5-lobed. Corolla rotate, 5-parted, the segments ovate-lanceolate. Staminate flowers with 3 stamens, the short filaments connate, the anther-sacs flexuous. Pistillate flowers 1 or 2, with an obovoid, 1-celled ovary containing a single pendulous ovule, the style short, the stigma 5–6-lobed. Fruit large, obovoid, sulcate, echinate or smooth, indehiscent, 1-seeded. [Similar to *Sicyos*.] A monotypic genus.

1. ***Sechium edule*** (Jacq.) Sw. Fl. Ind. Occ. 1150. 1800.

Sicyos edulis Jacq. Enum. 32. 1760.

Stem stout, up to 10 m. long or longer, the branches slender. Leaf-blades broadly ovate or suborbicular, 6–20 cm. long, angulate or lobed, scabrate, usually

deeply cordate, with a narrow sinus; petioles 4–15 cm. long; staminate raceme long-peduncled, interrupted, the short-pedicelled flowers 2–6 together in distant fascicles; calyx with a very short tube, the narrow segments 5–7 mm. long; corolla about 15 mm. broad, its segments ovate-lanceolate; pistillate flowers without staminodia, the ovary usually setose; fruit green, 8–12 cm. long.

Forests, wooded hills and banks in wet or moist districts, Porto Rico, ascending to higher elevations, apparently indigenous; often cultivated for its edible fruit in Porto Rico and the Virgin Islands:—widely distributed after cultivation in the West Indies and tropical continental America. CHAYOTE. CHOCHO.

13. **FEVILLEA** L. Sp. Pl. 1013. 1753.

Climbing vines, with membranous, angled or lobed leaves, 2-cleft tendrils and small paniced dioecious flowers. Calyx and corolla of the staminate and pistillate flowers similar, the calyx 5-lobed, the corolla divided into separate petals. Staminate flowers with 5 stamens, their anthers 1-celled, and 5 staminodes. Pistillate flowers with an oblong imperfectly 3-celled ovary, 3 styles, and reniform 2-lobed stigmas, the ovules pendulous. Fruit large, partly 3-celled. Seeds orbicular, flat. [Commemorates Louis Fevillier, 1660–1732, French botanist and traveller.] About 6 species, natives of tropical America, the following typical.

1. **Fevillea cordifolia** L. Sp. Pl. 1013. 1753.

Fevillea hederacea Poir. in Lam. Encycl. 4: 419. 1797.

Fevillea cordifolia hederacea Cogn. in DC. Mon. Phan. 3: 943. 1881.

Stem rather stout, glabrous, with slender elongated branches. Leaf-blades broadly oval, suborbicular or ovate-oblong, glabrous, 8–16 cm. long, 5-nerved, entire or lobed, short-acuminate, the base subcordate; petioles rather stout, shorter than the blades; staminate panicles 1–6 dm. long, many-flowered; pedicels filiform, puberulent, 1–6 mm. long; calyx 2–3 mm. long, its ovate lobes rounded; petals yellow or brown, spreading, orbicular-ovate, 3–4 mm. long; staminodia somewhat longer than the radiating stamens, the apex obliquely dilated; fruit globose, green, 10–12 cm. in diameter.

Thickets, forests and river-banks, Porto Rico, in moist parts of the central districts:—Jamaica; Cuba; Hispaniola; Trinidad (according to Cogniaux); continental tropical America. PEPITA AMARGA. SECUA. UYAMA.

Sicania odorifera (Vell.) Naud., PEPINO, South American, frequently cultivated in Porto Rico for its fruit, is a long vine, bearing a hard, nearly cylindric yellow to purple fruit 3–4 dm. long and about 8 cm. thick which is pleasantly fragrant. [*Cucurbita odorifera* Vell.]

Trichosanthes tamnifolia Poir., recorded by Poiret as collected in Porto Rico by Riedlé, many years ago, is not understood by modern botanists. [*Anguina tamnifolia* Kuntze.]

Trichosanthes Anguina L., SNAKE GOURD, East Indian, occasionally grown in Porto Rico, is a long vine with 3–7-lobed leaves, the staminate flowers racemose, the elongated twisted fruit about 1 m. long.

Family 2. **CAMPANULACEAE** Juss.

BELL-FLOWER FAMILY.

Herbs (some tropical species shrubs or even trees), with alternate exstipulate simple leaves, acid and usually milky juice, and perfect flowers. Calyx-tube adnate to the ovary, its limb mostly 5-lobed or 5-parted, the

lobes equal or slightly unequal, valvate or imbricate in the bud, commonly persistent. Corolla gamopetalous, its limb 5-lobed, regular, or rarely divided into separate petals. Stamens 5, alternate with the corolla-lobes, inserted with the corolla; filaments separate or connate; anthers 2-celled, introrse, separate, or united into a ring or tube. Ovary 2-5-celled (rarely 6-10-celled), with the placentae projecting from the axis, or 1-celled with two parietal placentae; style simple; stigma mostly 2-5-lobed; ovules anatropous. Fruit a capsule. Seeds numerous, small; embryo minute, straight; endosperm fleshy. About 40 genera and 1000 species, of wide distribution.

1. **SPHENOCLEA** Gaertn. Fr. & Sem. 1: 113. 1788.

An erect glabrous annual herb, with alternate entire short-petioled leaves, the small, white flowers in dense elongated terminal peduncled spikes. Calyx hemispheric, the limb with 5 rounded imbricated lobes. Corolla campanulate, short. Stamens borne at the base of the corolla; anthers short. Ovary 2-celled, half-inferior; ovules many; stigma 2-lobed. Capsule depressed-globose, circumscissile [Greek, a closed wedge]. A monotypic genus.

1. **Sphenoclea zeylanica** Gaertn. Fr. & Sem. 1: 113. 1788.

Pongatium indicum Lam. Tabl. Encycl. 1: 444. 1791.

Sphenoclea Pongatium DC. Prodr. 7: 548. 1839.

Pongatium zeylanicum Kuntze, Rev. Gen. Pl. 381. 1891.

Stem 3-10 dm. high, rather stout, the branches slender, ascending. Leaves oblong to oblong-lanceolate or elliptic, thin, 4-12 cm. long, acute or obtuse, the base narrowed, the slender petioles 5-30 mm. long; spikes subcylindric, densely many-flowered, about 8 cm. long or shorter, in fruit nearly 1 cm. thick; flowers about 2 mm. broad; capsule about 2 mm. in diameter.

Ditches and wet waste grounds, Porto Rico:—Louisiana; Trinidad; continental tropical America and Old World tropics. CAMPANILLA.

Family 3. **LOBELIACEAE** Dumort.

LOBELIA FAMILY.

Herbs, or in tropical regions rarely shrubs or trees, often with milky sap which contains a narcotic-acid poison, with alternate estipulate simple entire, toothed or pinnately parted leaves, and solitary spicate racemose or paniculate flowers. Calyx-tube adnate to the ovary, its limb 5-lobed or 5-parted, the lobes equal or unequal. Corolla gamopetalous, irregular, often bilabiate, its tube often open on one side quite to the base, its limb 5-lobed; stamens 5, inserted with the corolla; filaments sometimes cohering into a tube; anthers united. Ovary 2-5-celled; style single; stigma fringed; ovules numerous, sessile, horizontal, anatropous. Fruit a 1-5-celled capsule, or a berry. Seeds numerous, with a smooth or furrowed testa. Endosperm fleshy. About 20 genera and 600 species, of wide geographic distribution.

Corolla-tube split to the base on the dorsal side; stamens free.

Corolla 2-lipped.

Corolla not 2-lipped.

Corolla-tube not split; stamens borne on it above the middle.

1. *Lobelia*.

2. *Tupa*.

3. *Isotoma*.

1. **LOBELIA** L. Sp. Pl. 929. 1753.

Herbs, with alternate or basal leaves, and racemose spicate or paniculate flowers. Corolla-tube divided to the base on one side, 2-lipped, the lobe on each

side of the cleft erect or recurved, turned away from the other 3 which are somewhat united. Stamens free from the corolla-tube, monadelphous, at least above, 2 or all the 5 anthers with a tuft of hairs at the tips. Ovary 2-celled, the 2 placentae many-ovuled; stigma 2-lobed or 2-cleft. Capsule loculicidally 2-valved. [Named after Matthias de L'Obel, 1538-1616, a Flemish botanist.] About 200 species of wide geographic distribution. Type species: *Lobelia Dortmanna* L.

1. **Lobelia Cliffortiana** L. Sp. Pl. 931. 1753.

Dortmanna Cliffortiana Kuntze, Rev. Gen. Pl. 380. 1891.

Annual, erect or nearly so, slender, usually branched, glabrous, or puberulent above, 2-5 dm. high. Leaves ovate or ovate-orbicular, thin, 1-2.5 cm. long, dentate, obtuse or acute, the base subcordate, rounded or narrowed, the petioles 2 cm. long or shorter; racemes slender, several-many-flowered; bractlets linear, shorter than the filiform pedicels; calyx turbinate-campanulate, 2-3 mm. long, its lobes linear, acuminate; corolla blue or white, about 4 mm. long; two of the anthers with tufts of hairs, the others naked; capsule about 5 mm. long.

Moist banks, fields and in cultivated grounds at lower and middle elevations, Porto Rico;—Florida; Jamaica; Cuba; Hispaniola; Martinique; Dominica; Trinidad; continental tropical America. CARDENALA AZUL.

2. **TUPA** G. Don, Gen. Syst. 3: 700. 1834.

Tall perennial herbs, or shrubs, the stems simple or branched, erect, the alternate leaves toothed or entire, the large flowers in terminal racemes. Corolla 1-lipped, curved, the tube split to the base on one side, the lip 5-cleft. Stamens free from the corolla, connate; all the anthers or only 2 of them with tufts of hairs at the apex. Ovary 2-celled; stigma 2-lobed. Capsule 2-valved. [Chilean name.] About 30 species, of tropical America. Type species: *Lobelia Tupa* L.

Leaves sessile, dentate, the lower teeth elongated, the narrowed base decurrent on the stem.

Leaves slender-petioled, evenly finely denticulate.

1. *T. robusta*.
2. *T. portoricensis*.

1. **Tupa robusta** (Graham) A. DC. Prodr. 7: 394. 1839.

Lobelia robusta Graham, Edinb. New Phil. Journ. 11: 378. 1831.

Tylomnium robustum Presl, Prodr. Lob. 32. 1836.

Tupa assurgens portoricensis DC. Prodr. 7: 394. 1839.

Dortmanna acuminata pubescens Kuntze, Rev. Gen. Pl. 379. 1891.

Lobelia assurgens portoricensis Urban, Symb. Ant. 1: 454. 1899.

Herbaceous; stem stout, about 2 m. high or less, glabrous or somewhat pubescent above. Leaves oblong to oblong-oblancheolate, thin, sessile, 1-3 dm. long, dentate or denticulate all around, the teeth of the lower part elongated and distant, the apex acuminate, the base attenuate and decurrent on the stem; racemes 1-2 dm. long, many-flowered, densely short-pubescent; pedicels secund, slender, 2-3 cm. long; bracts linear, about as long as the pedicels or shorter; calyx-lobes linear-lanceolate or triangular-lanceolate, 4-10 mm. long; corolla dull purple or reddish, about 15 mm. long; capsule subglobose, about 10 mm. in diameter.

Wooded hills, banks and forests in moist or wet districts of Porto Rico, ascending to higher elevations; Cuba; Hispaniola. CHICORIA CIMARRONA.

2. **Tupa portoricensis** Vatke, Linnaea 38: 727. 1874.

Lobelia portoricensis Urban, Symb. Ant. 1: 453. 1899.

Somewhat woody, 1-8 m. high, the stem glabrous, or puberulent above. Leaves oblong to elliptic or elliptic-lanceolate, membranous, glabrous, shining,

slender-petioled, 1–2.5 dm. long, finely denticulate, long-acuminate, the base cuneate; racemes puberulent, about 2 dm. long or shorter; bracts linear; pedicels 2–3 cm. long, 2-bracteolate; calyx-teeth linear-lanceolate, 7–10 mm. long; corolla greenish-red, about 2.5 cm. long; capsule globose-obovoid, 10–15 mm. long. [*Tupa acuminata* of Bello, not of de Candolle.]

Mountain forests of Porto Rico at middle and higher elevations. Endemic. TUPA. TIBEY-TUPA.

3. *ISOTOMA* Lindl. Bot. Reg. pl. 964. 1826.

Herbs, with alternate leaves, the large flowers axillary or forming terminal racemes. Calyx with a 5-parted limb, the segments narrow. Corolla with a long cylindric tube and a 5-cleft spreading limb, the lobes slightly unequal. Stamens borne on the corolla-tube near the top or above the middle, the filaments more or less connate, 2 of the anthers tipped by a bristle, the other 3 larger, not tipped. Ovary 2-celled; stigma 2-lobed. Capsule oblong to cylindric, loculicidally 2-valved. [Greek, equally divided.] About 8 species, mostly Australasian, only the following one American. Type species: *Isotoma axillaris* Lindl.

1. *Isotoma longiflora* (L.) Presl, Prodr. Lob. 42. 1836.

Lobelia longiflora L. Sp. Pl. 930. 1753.

Perennial, pubescent, simple or little branched, erect or straggling, about 6 dm. high or lower, the stem leafy. Leaves lanceolate to oblong or oblanceolate, flaccid, 6–12 cm. long, sessile, coarsely sinuate-dentate, acute or obtuse, the base long-tapering; flowers solitary in the axils, short-peduncled; calyx-segments linear, 10–15 mm. long; corolla bright white, its slender tube 8–11 cm. long, its oblong-oblanceolate lobes about 2 cm. long; capsule ellipsoid, nodding, about 1.5 cm. long. [*Isotoma hirta* of Krebs.]

Banks, hillsides, fields and cultivated grounds, Porto Rico, mostly at lower elevations in wet or moist districts; St. Croix; St. Thomas; St. Jan; Tortola:—Jamaica; Cuba; Hispaniola; Antigua to Trinidad. TIBEY.

Family 4. GOODENIACEAE Dumort.

GOODENIA FAMILY.

Herbaceous or shrubby plants, with watery sap. Leaves alternate or sometimes opposite, without stipules, entire, toothed or rarely pinnatifid. Flowers perfect. Calyx 5-toothed, an entire border, or sometimes obsolete. Corolla 5-lobed, split on one side. Stamens 5, distinct, the anthers opening lengthwise. Ovary mostly inferior, 1–2-celled; styles usually united. Stigma surrounded with an indusium. Ovules 1 or 2, or more in each cavity, mostly erect or ascending. Fruit drupaceous, berry-like or capsular. Seeds usually one in each cavity; embryo straight in the axis of the fleshy endosperm. About 12 genera and over 200 species, mostly Australian.

1. *SCAEVOLA* L. Mant. 2: 145. 1771.

Fleshy stout herbs or shrubs with alternate or rarely opposite, mostly entire leaves, the flowers irregular, axillary, in dichotomous cymes or rarely solitary. Calyx 5-lobed, or a mere border. Corolla white or blue, its lobes winged, its tube split to the base on one side, villous within. Stamens epigynous. Ovary inferior or nearly so, 2-celled or rarely 1-celled; stigma surrounded by a ciliate indusium. Ovules 1 in each cavity, or 2 in 1-celled ovaries, erect. Berry with a

fleshy exocarp and a bony or woody endocarp. [Latin, referring to the irregular flowers.] About 50 species, mostly Australian, the following typical.

1. **Scaevola Plumierii** (L.) Vahl, Symb. 2: 36. 1791.

Lobelia Plumierii L. Sp. Pl. 929. 1753.

Scaevola Lobelia Murr. Syst. ed. 13, 178. 1774.

Perennial, nearly glabrous, more or less shrubby, 6–15 dm. high, much branched and straggling. Leaves alternate, obovate, 4–6 cm. long, entire, shining, narrowed into very short winged petioles, or nearly sessile, with a tuft of silky hairs in each axil; peduncles shorter than the leaves; calyx-lobes much broader than high, rounded; corolla glabrous without, about 2.5 cm. long, the tube shorter than the lobes, the lobes nearly linear, with broad crisped wings; stamens nearly as long as the corolla-tube, hanging through the cleft; berry oval, black, juicy, 2-seeded, 10–14 mm. long.

Coastal sands and rocks, Porto Rico; Vieques; St. Croix; St. Thomas; Tortola; Virgin Gorda; Anegada;—Florida; Bermuda; West Indies; Mexico; Old World tropics. BOSBORIN. INKBERRY.

Family 5. **CICHORIACEAE** Reichenb.

CHICORY FAMILY.

Herbs (two Pacific Island genera trees), almost always with milky, acrid or bitter juice, alternate or basal leaves, and yellow, rarely pink, blue, purple, or white flowers in involucre heads (anthodia). Bracts of the involucre in 1 to several series. Receptacle of the head flat or flattish, naked, scaly (paleaceous), smooth, pitted, or honeycombed. Flowers all alike (heads homogamous), perfect. Calyx-tube completely adnate to the ovary, its limb (pappus) of scales, or simple or plumose bristles, or both, or wanting. Corolla gamopetalous, with a short or long tube, and a strap-shaped (ligulate) usually 5-toothed limb (ray). Anthers connate into a tube around the style, the sacs sagittate or auricled at the base, not tailed, usually appendaged at the summit, the simple pollen-grains usually 12-sided. Ovary 1-celled; ovule 1, anatropous; style very slender, 2-cleft, or 2-lobed, the lobes minutely papillose. Fruit an achene. Seed erect; endosperm none; radicle narrower than the cotyledons. About 70 genera and 1500 species, of wide geographic distribution.

Achenes flattened, not muricate.

Achenes truncate, not at all beaked.

Achenes beaked, or distinctly narrowed at the top.

Achenes nearly terete, muricate.

1. *Sonchus*.

2. *Lactuca*.

3. *Brachyramphus*.

1. **SONCHUS** L. Sp. Pl. 793. 1753.

Annual or perennial succulent herbs, with alternate, mostly auriculate-clasping, entire dentate lobed or pinnatifid, prickly-margined leaves, and large or middle-sized, peduncled, corymbose or paniculate heads of yellow flowers. Involucre ovoid or campanulate, usually becoming thickened and more or less conic at the base when old, its bracts herbaceous or membranous, imbricated in several series, the outer successively smaller. Receptacle flat, naked. Rays truncate and 5-toothed at the apex. Anthers sagittate at the base. Style-branches slender. Achenes oval, oblong, or linear, more or less flattened, 10–20-ribbed, somewhat narrowed at the base, truncate. Pappus of very copious soft white simple capillary bristles, usually falling away connected, sometimes

with 1 or 2 stouter ones which fall separately. [The Greek name of the Sow-thistle.] About 45 species, of the Old World. Type species: *Sonchus oleraceus* L.

Auricles of the leaves acute; achenes striate and transversely wrinkled. 1. *S. oleraceus*.
Auricles rounded; achenes ribbed, not transversely wrinkled. 2. *S. asper*.

1. ***Sonchus oleraceus* L. Sp. Pl. 794. 1753.**

Annual, with fibrous roots; stem leafy below, nearly simple, 3–30 dm. high. Basal and lower leaves petioled, lyrate-pinnatifid, 10–25 cm. long, the terminal segment commonly large and triangular, the margins denticulate with mucronate or scarcely spiny teeth; upper leaves pinnatifid, clasping by an auricled or sagittate base; uppermost leaves often lanceolate and entire; heads several or numerous, pale yellow, 18–30 mm. broad. [*S. arvensis* of Bello, not of Linnaeus.]

In fields and waste and cultivated grounds, Porto Rico; Vieques; Culebra; St. Croix; St. Thomas; St. Jan; Tortola:—temperate and tropical continental America; Bermuda; West Indies. Native of the Old World. ACHICORIA. SOW-THISTLE.

2. ***Sonchus asper* (L.) Hill, Herb. Brit. 1: 47. 1769.**

Sonchus oleraceus asper L. Sp. Pl. 794. 1753.

Annual, similar to the preceding species; leaves undivided, lobed or sometimes pinnatifid, spinulose-dentate to spinulose-denticulate, the lower and basal ones obovate or spatulate, petioled, the upper oblong or lanceolate, clasping by an auricled base; heads several or numerous, 25 mm. broad or less; flowers pale yellow.

River-banks near Adjuntas and Cayey, Porto Rico:—Continental North America; Bermuda; Jamaica; Guadeloupe; Martinique; South America. Native of the Old World.

2. **LACTUCA L. Sp. Pl. 795. 1753.**

Tall leafy herbs, with small paniced heads of yellow, white or blue flowers, and alternate leaves. Involucre cylindric, its bracts imbricated in several series, the outer shorter, or of 1 or 2 series of principal nearly equal inner bracts, and several rows of short outer ones. Receptacle flat, naked. Rays truncate and 5-toothed at the summit. Anthers sagittate at the base. Style-branches mostly slender. Achenes oval, oblong or linear, flat, 3–5-ribbed on each face, narrowed above or contracted into a narrow beak, which is somewhat expanded at the summit into a small disk bearing the copious soft capillary white or brown pappus-bristles. [The ancient Latin name, from lac, milk, referring to the milky juice.] About 95 species, natives of the northern hemisphere. Type species: *Lactuca sativa* L.

Achenes short-beaked; rays blue.
Achenes long-beaked; rays yellow.

1. *L. floridana*.
2. *L. sativa*.

1. ***Lactuca floridana* (L.) Gaertn, Fr. & Sem. 2: 362. 1791.**

Sonchus floridanus L. Sp. Pl. 794. 1753.

Mulgedium floridanum DC. Prodr. 7: 249. 1838.

Annual or biennial; stem glabrous, rather stout, leafy up to the large paniculate inflorescence, 1–2 m. high. Leaves sessile or petioled, 1–3 dm. long, glabrous above, pubescent on the veins beneath, the lateral segments lanceolate to oval, acute, all usually dentate or the leaves irregularly lobed; heads numerous, 6–10 mm. broad; rays blue; involucre about 12 mm. high; achenes lanceolate, 5–7 mm. long. [*Brachyrhynchus caribaeus* of Stahl, not of de Candolle.]

Wet grounds, Porto Rico, mostly along streams at middle elevations in the central and western districts:—southeastern United States.

2. **Lactuca sativa** L. Sp. Pl. 795. 1753.

Annual, glabrous, 5–9 dm. or more high, the leafy stem often much-branched above. Upper stem-leaves ovate to orbicular, the lower variable, obovate, ovate or orbicular, 3.5–15 cm. long, 1.5–6.5 cm. broad, often larger, apiculate-serrulate, the base auriculate-clasping; panicle 0.6–3 dm. broad; heads numerous, erect, 12–16-flowered; rays yellow; involucre 10–12 mm. high; achenes broadly oblanceolate, 3–4 mm. long, blackish.

Occasionally spontaneous after cultivation for its crisp edible leaves; grown for salad in Porto Rico and the Virgin Islands, and widely cultivated in temperate and tropical regions. Native of the Old World. LETTUCE. LECHUGA.

Lactuca canadensis L., of temperate North America, was recorded by Krebs from St. Thomas, in 1851, possibly grown there from seed.

3. **BRACHYRAMPHUS** DC. Prodr. 7: 176. 1838.

Erect branching herbs, with runcinate or dentate leaves, and racemose-panicked 10–15-flowered heads of yellow or white ligulate flowers. Involucre narrowly oblong, its bracts imbricated in few series, scarious-margined. Receptacle naked. Achenes linear or linear-oblong, subterete, longitudinally ribbed, muricate, narrowed above into a short neck. Pappus of several series of soft white pilose bristles. [Greek, short-beaked.] A few species, natives of tropical regions, the following typical.

1. **Brachyramphus intybaceus** (Jacq.) DC. Prodr. 7: 177. 1838.

Lactuca intybacea Jacq. Icon. Rar. 1: 16. 1786.

Brachyramphus caribaeus DC. Prodr. 7: 177. 1838.

Glabrous; stem 5–12 dm. high, sometimes much branched, the branches ascending. Basal and lower leaves obovate to oblanceolate in outline, runcinate-pinnatifid or irregularly dentate, bristly-serrulate, 2 dm. long or less; upper leaves few and small, the large panicle nearly naked; outer involucre-bracts and those of the peduncles ovate, acute, broadly scarious-margined, the inner linear-lanceolate, narrowly margined; involucre 10–12 mm. high; achenes about 5 mm. long, somewhat shorter than the pappus. [*Sonchus maritimus* of Sessé & Mocino, not of Linnaeus; *Trachodes intybacea* of Krebs.]

Roadsides, waste and cultivated grounds, Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; West Indies; tropical continental America. WILD LETTUCE. CHICORIA AZUL.

Cichorium Endivia L., ENDIVE, East Indian, occasionally grown for salad in Porto Rico, is annual or biennial, the oblong basal leaves lobed and cut, the stems occasionally 12 dm. high, the rays light blue.

Cichorium Intybus L., ACHICORIA, CHICORY, of the Old World, occasionally cultivated in Porto Rico mountain gardens, is perennial, with a deep root, herbaceous, about 1 m. high with pinnatifid basal leaves, the heads 3–4 cm. broad, the rays bright blue.

Launaea nudicaulis (Less.) Hook. f., East Indian, was listed by Krebs as found in St. Thomas. [*Microrhynchus nudicaulis* Less.]

Leontodon Taraxacum L., DIENTE DE LEON, DANDELION, European and Asiatic, widely distributed as a weed in temperate regions, was grown experimentally at the Trujillo Plant Propagation Station in 1925. It is an acaulescent herb, with a deep root, a tuft of basal sinuate-dentate leaves 1–2.5 dm. long, the

solitary head of bright yellow flowers borne on a hollow scape 1-3 dm. high. Its leaves are used like spinach.

Tragopogon porrifolius L., SALSIFY, SALSIFI, OYSTER-PLANT, European, experimentally grown at middle altitudes in Porto Rico for its edible roots, is a tall herb, with long, narrowly lanceolate leaves, the showy heads of purple flowers 5-10 cm. broad, the involucre-bracts longer than the rays.

Scolymus hispanicus L., SALSIFI ESPAÑOL, of southern Europe, recently experimentally grown for its edible roots at the Cayey Model Farm, is a tall biennial, with spinulose-pinnatifid leaves, and large, leafy-bracted heads of yellow flowers.

Scorzonera hispanica L., ESCORCIONERA, BLACK SALSIFY, European, also grown experimentally for its edible roots at the Cayey Model Farm, is perennial, 1 m. high or lower, with lanceolate to ovate leaves, and rather large heads of yellow flowers.

Family 6. **AMBROSIACEAE** Reichenb.

RAGWEED FAMILY.

Herbs, monoecious, or sometimes dioecious, rarely shrubby, with alternate or opposite leaves, and small heads of greenish or white flowers subtended by an involucre of few, separate or united bracts, the pistillate heads sometimes larger and nut-like or bur-like. Staminate and pistillate flowers in the same, or in separate heads. Receptacle chaffy. Pistillate flowers with no corolla, or this reduced to a short tube or ring; calyx adnate to the 1-celled ovary, its limb none, or a mere border; style 2-cleft. Staminate flowers with a funnelform tubular or obconic 4-5-lobed corolla; stamens mostly 5, separate, or their anthers merely connivent, with short inflexed appendages; ovary rudimentary; summit of the style often hairy or penicillate. Eight genera and about 60 species, mostly natives of America.

Bracts of staminate involucre distinct.
Bracts of staminate involucre united.

1. *Xanthium*
2. *Ambrosia*.

1. **XANTHIUM** L. Sp. Pl. 987. 1753.

Monoecious annual branching coarse rough or spiny herbs, with alternate lobed or dentate leaves, and rather small heads of greenish discoid flowers, the staminate ones capitate-clustered at the ends of the branches, the pistillate axillary. Staminate heads with a short involucre of 1 to 3 series of distinct bracts; receptacle cylindric, chaffy; corollas tubular, 5-toothed; anthers not coherent, mucronate at the apex; filaments monadelphous; style slender, undivided. Pistillate heads of an ovoid or oblong, closed involucre, covered with hooked bristles, 1-2-beaked, 2-celled, each cavity containing one obovoid or oblong achene; corolla none; pappus none; style 2-cleft, its branches exerted. [Greek, yellow, from its yielding a yellow hair-dye.] About 20 species, of wide geographic distribution. Known as **BARDANA** and **BURDOCK**. Type species: *Xanthium strumarium* L.

1. **Xanthium chinense** Mill. Gard. Dict. ed. 8, no. 4. 1768.

Xanthium macrocarpum glabratum DC. Prodr. 5: 523. 1836.
Xanthium longirostre Wallr. Beitr. Bot. 1: 237. 1844.

Hispidulous, 1 m. high or less. Leaves broadly ovate-reniform in outline, slender-petioled, 8-15 cm. long and about as wide as long, acute or acuminate

at the apex, rather thin, coarsely irregularly toothed and usually 3-5-lobed, scabrous on both sides, the base triangular-cuneate; staminate heads numerous, about 5 mm. in diameter; fruit oblong, its body 2 cm. long or less, 5.5-8 mm. thick, hispidulous and glandular or sometimes glabrous; bristles rather slender, 3-4.5 mm. long, hispidulous toward the base; beaks stout, 4-6 mm. long, somewhat incurved. [*Xanthium canadense* of Cook and Collins, not of Miller; *Xanthium strumarium* of Bello and of Millspaugh, not of Linnaeus. *Xanthium echinatum* of Urban, not of Murray; *Xanthium orientale* of Schlechtendal.]

Waste and cultivated grounds, Porto Rico, at lower elevations; Vieques; St. Croix; St. Thomas; St. Jan (according to Eggers); Tortola;—eastern North America; Bermuda; Bahamas; Jamaica; Cuba; Hispaniola; Saba to Martinique.

***Xanthium spinosum* L.**, listed by Krebs from St. Thomas, and also recorded by Borgesen from the Virgin Islands (Veg. Dansk-Vestindian) has 3-parted spines 1-2.5 cm. long in the axils and leaves narrowed at the ends: it is widely distributed in temperate regions, but unknown in the West Indies; both records are, presumably erroneous.

2. **AMBROSIA** L. Sp. Pl. 987. 1753.

Monoecious (rarely dioecious) branching herbs, with alternate or opposite, mostly lobed leaves, and small heads of green flowers, the staminate spicate or racemose, the pistillate solitary or clustered in the upper axils. Involucre of the pistillate heads globose, ovoid to top-shaped, closed, 1-flowered, usually armed with 4-8 tubercles or spines; corolla none; stamens none; style-branches filiform; achenes ovoid or obovoid; pappus none. Involucre of the staminate heads mostly hemispheric or saucer-shaped, 5-12-lobed, open, many-flowered; receptacle nearly flat, naked, or with filiform chaff; corolla funnelform, 5-toothed; anther scarcely coherent, mucronate-tipped; style undivided, penicillate at the summit. [The ancient classical name.] About 15 species, mostly natives of America. Type species: *Ambrosia maritima* L.

Prostrate; densely hirsute.

1. *A. hispida*.

Erect; pubescent.

Leaf-segments 1-3 cm. long.

2. *A. peruviana*.

Leaf-segments mostly less than 1 cm. long.

3. *A. tenuifolia*.

1. **Ambrosia hispida** Pursh, Fl. Am. Sept. 743. 1814.

Ambrosia crithmifolia DC. Prodr. 5: 525. 1836.

Perennial, hirsute or hispid; stems branched at the base, the branches diffusely spreading or ascending, 2-8 dm. long, leafy. Leaves 2-3-pinnately divided, rather firm in texture, 4-12 cm. long, short-petioled; racemes of staminate heads elongated, mostly solitary, the involucre bristly-pubescent; fertile heads clustered, 2.5-3 mm. long, short-beaked, usually tubertled.

Maritime rocks and sand-dunes, northern coast of Porto Rico; Tortola; Virgin Gorda; planted for ornament and for a ground-cover in Porto Rico and the Virgin Islands:—Florida; West Indies (except Jamaica) south to Barbados; Mexico. BAY TANSY.

2. **Ambrosia peruviana** Willd. Sp. Pl. 4: 377. 1805.

Ambrosia paniculata peruviana O. E. Schulz in Urban, Symb. Ant. 7: 87. 1911.

Perennial, erect, branched, strigose-pubescent, 2 m. high or less. Leaves deeply pinnately lobed or bipinnatifid, 4-15 cm. long, the lobes or segments lanceolate or ovate, acute or obtuse; racemes of staminate heads slender; peduncles 1-1.5 mm. long; involucre hispidulous, 3-4 mm. broad; pistillate heads

few in the upper axils, short-beaked, the fruit 2.5–3 mm. long. [? *A. artemisiaefolia* of Krebs.]

Occasional in waste and cultivated grounds, Porto Rico, persistent after cultivation or escaped; (?) St. Thomas;—Jamaica; Cuba; Mexico; South America. ARTEMISA.

3. *Ambrosia tenuifolia* Spreng. Syst. 3: 851. 1826.

Appressed-pubescent and somewhat villous, 3–6 dm. high, branching. Leaves bipinnatifid, finely divided, 5–8 cm. long, slender-petioled, the ultimate segments small, about 1 cm. long or shorter, linear to ovate, mostly acute; immature staminate inflorescence 2–3 cm. long, the heads about 1.5 mm. broad.

Collected by Stevenson at Algaroba, and by Britton in white sand near Laguna Tortuguero, Porto Rico. The plant collected by Stevenson was referred to this species by Rydberg (N. A. Fl. 33: 16); it bears young inflorescence. The specimens found near Laguna Tortuguero are barren; at that place the plant appeared like a native perennial. The true *A. tenuifolia* is an annual, native of Uruguay and Argentina, adventive in Louisiana. Complete specimens of the Porto Rico plant are necessary to determine its actual relationship.

Ambrosia cumanensis H.B.K. [*A. artemisiaefolia trinitensis* Griseb.], recorded by Eggers in 1876 as naturalized at Fredericksted, St. Croix, has not been observed there recently. It is similar to *A. peruviana*, differing especially in its hirsute stems and branches.

Family 7. CARDUACEAE Neck.

THISTLE FAMILY.

Herbs, rarely shrubs (some tropical species trees), with watery or resinous (rarely milky) sap, and opposite alternate or basal estipulate leaves. Flowers perfect, pistillate, or neutral, or sometimes monoecious, or dioecious, borne on a common receptacle, forming heads, subtended by an involucre of few to many bracts arranged in one or more series. Receptacle naked, or with chaffy scales subtending the flowers, smooth or variously pitted or honey-combed. Calyx-tube completely adnate to the ovary, the limb (pappus) of bristles, awns, teeth, scales, or crown-like, or cup-like, or wanting. Corolla tubular, usually 5-lobed or 5-cleft, the lobes valvate, or that of the marginal flowers of the head expanded into a ligule (ray): when the ray-flowers are absent the head is said to be discoid; when present, radiate; the tubular flowers form the disk. Stamens usually 5, borne on the corolla and alternate with its lobes, their anthers united into a tube (syngenesious), often appendaged at the apex, sometimes sagittate or tailed at the base; pollen-grains globose, often rough or prickly. Ovary 1-celled; ovule 1, anatropous; style of fertile flowers 2-cleft; stigmas marginal; style of sterile flowers commonly undivided. Fruit an achene. Seed erect; endosperm none; embryo straight; hypocotyl inferior. About 800 genera and not less than 10,000 species, of wide geographic distribution.

A. Perfect flowers with regular corollas.

1. Stigmatic lines at the base of the stigma or below the middle.

Stigmas filiform or subulate, hispidulous.

Stigmas more or less clavate, papillose-puberulent.

2. Stigmatic lines extending to the tip of the stigma or to the appendages.

a. Anthers without elongated appendages at the tip.

Anther-sacs tailed at the base.

Anther-sacs not tailed at the base.

Receptacle naked.

Bracts of the involucre well imbricated.

Stigmas of the perfect flowers with terminal appendages.

Tribe 1. VERNONIEAE.
Tribe 2. EUPATORIEAE.

Tribe 4. INULEAE.

Tribe 3. ASTEREAE.

- Stigmas of the perfect flowers with truncate, hairy or papillose tips.
 Bracts of the involucre little if at all imbricated except when the broad outer overlap the inner.
 Receptacle mostly chaffy; bracts of the involucre herbaceous, sometimes foliaceous.
 b. Anthers with elongated, cartilaginous, mostly connate appendages.
 B. Perfect flowers, or all, with bilabiate corollas.
- Tribe 1. VERNONIEAE.
1. Heads separate and distinct.
 Pappus a cartilaginous ring.
 Pappus of scales or bristles, or of both.
 Foliage not lepidote.
 Foliage lepidote or stellate-tomentose.
 Outer pappus of broad scales, the inner of twisted narrow ones.
 Outer pappus of linear scales, the inner of bristles.
 2. Heads glomerate.
 Involucre-bracts 8 or more
 Pappus-bristles all alike, straight.
 Pappus-bristles dissimilar.
 Involucre-bracts only 2.
- Tribe 2. EUPATORIEAE.
- Anthers truncate, not appendaged.
 Anthers appendaged.
 Pappus of scales.
 Pappus of capillary bristles.
 Involucre-scales more than 4; heads several-many-flowered; mostly shrubs.
 Receptacle pilose.
 Receptacle naked.
 Involucre cylindric or oblong, its bracts in several series, coriaceous or chartaceous, striate.
 Involucre various, its bracts in 1 or few series, mostly membranous or herbaceous.
 Heads many-flowered.
 Heads few-flowered.
 Involucre-scales only 4; heads 4-flowered; mostly vines.
- Tribe 3. ASTEREEAE.
- Ray-flowers present; plants not dioecious.
 Pappus none; achene topped by a cartilaginous ring.
 Pappus of capillary bristles.
 Involucre-bracts in 4 or 5 series.
 Involucre-bracts in 1-3 series.
 Ligules mostly longer than the diameter of the disk.
 Ligules minute, shorter than the diameter of the disk.
 Ray--flowers none; plants dioecious.
- Tribe 4. INULEAE.
- Involucre-bracts herbaceous.
 Heads corymbose; involucre-bracts broad.
 Heads glomerate; involucre-bracts narrow.
 Involucre-bracts scarious.
- Tribe 5. HELIANTHEAE.
- A. Heads only 1-flowered, glomerate.
 B. Heads few-many-flowered.
 1. Disk-flowers perfect, but not producing fruit.
 Receptacle naked or bearing a few scales.
 Receptacle chaffy.
 Achenes thick, not flattened.
 Fruit unarmed.
 Fruit armed with hooked prickles.
 Achenes flattened.
 2. Disk-flowers producing fruit.
 a. Ray-flowers persistent on the achenes.
 b. Ray-flowers not persistent, sometimes wanting.
 *Pappus a mere crown or of a few teeth or awns.
 †Achenes, at least those of the disk, not flattened, or laterally flattened.
 ‡Outer involucre-bracts 4, large, opposite in pairs.
 ††Outer involucre-bracts not opposite in pairs.
 §Chaff of the receptacle mere bristles.
- Tribe 6. HELENIEAE.
 Tribe 7. SENECTIONEAE.
 Tribe 5. HELIANTHEAE.
 Tribe 8. CYNAREAE.
 Tribe 9. MUTISIEAE.
1. *Struchium*.
 2. *Vernonia*.
 3. *Piptocoma*.
 4. *Piptocarpha*.
 5. *Elephantopus*.
 6. *Pseudelephantopus*.
 7. *Rolandra*.
 8. *Adenostemma*.
 9. *Ageratum*.
 10. *Hebeclinium*.
 11. *Osmia*.
 12. *Eupatorium*.
 13. *Critonia*.
 14. *Mikania*.
 15. *Egletes*.
 16. *Gundlachia*.
 17. *Erigeron*.
 18. *Leptilon*.
 19. *Baccharis*.
 20. *Pluchea*.
 21. *Pterocaulon*.
 22. *Gnaphalium*.
 23. *Nocca*.
 24. *Clibadium*.
 25. *Melampodium*.
 26. *Acanthospermum*.
 27. *Parthenium*.
 28. *Crassina*.
 29. *Enydra*.
 30. *Verbesina*.

- §§Chaff of the receptacle concave or clasping.
 | Achenes closely invested by the chaff. 31. *Sclerocarpus*.
 || Achenes subtended or enclosed by chaff.
 ¶ Achenes wingless.
 Achenes angled.
 Pappus of scales.
 Ray-flowers present.
 Ray-flowers fertile.
 Achenes sharply angled; shrubs. 32. *Borrchia*.
 Achenes obtusely angled; herbs or shrubs. 33. *Wedelia*.
 Ray-flowers sterile. 34. *Tithonia*.
 Ray-flowers wanting. 35. *Eleutheranthera*.
 Pappus of deciduous awns or bristles. 36. *Melanthera*.
 Achenes laterally flattened.
 Herbs; heads few or solitary. 37. *Spilanthes*.
 Shrubs or woody vines; heads cymose. 38. *Salmea*.
 ¶ Achenes of the disk-flowers broadly winged. 39. *Tepion*.
 Pappus-awns hooked. 40. *Ximenesia*.
 Pappus-awns not hooked.
 †† Achenes dorsally flattened parallel with the involucre-bracts.
 Involucre single. 41. *Synedrella*.
 Involucre double.
 Achenes beakless; ray-flowers yellow or white. 42. *Bidens*.
 Achenes beaked; ray-flowers mostly rose or purple, sometimes yellow. 43. *Cosmos*.
 **Pappus of several or many scales. 44. *Galinsoga*.
 Pappus-scales not plumose. 45. *Tridax*.
 Pappus-scales plumose-ciliate.

Tribe 6. HELENIEAE.

- Style-branches of the perfect flowers elongated. 46. *Tagetes*.
 Pappus of scales. 47. *Porophyllum*.
 Pappus of bristles. 48. *Pectis*.
 Style-branches of the perfect flowers very short, blunt.

Tribe 7. SENECTIONEAE.

- Receptacle chaffy. 49. *Neurolaena*.
 Receptacle naked. 50. *Erechthites*.
 Marginal flowers pistillate; disk-flowers perfect. 51. *Emilia*.
 Flowers all perfect.

Tribe 8. CYNAREAE.

- Only one genus in our territory. 52. *Cirsium*.

Tribe 9. MUTISIEAE.

- Shrubs or woody vines with alternate leaves. 53. *Proustia*.
 Scapose herbs, the scapes monocephalous. 54. *Chaptalia*.

1. **STRUCHIUM** P. Br.; J. St. Hil. Expos. Fam. 1: 406. 1805.

A slightly succulent herb, with thin alternate petioled serrate leaves, and sessile axillary many-flowered heads of perfect tubular white or purplish flowers. Involucre hemispheric, its bracts imbricated in several series. Receptacle convex. Corolla 3-4-lobed; style-branches slender. Achenes mostly 4-angled, truncate, glabrous or finely glandular; pappus a cartilaginous crown with no bristles. [Greek, of uncertain derivation.] A monotypic genus of tropical America and tropical Africa.

1. **Struchium sparganophorum** (L.) Kuntze, Rev. Gen. Pl. 366. 1891.

Ethulia sparganophora L. Sp. Pl. ed. 2, 1171. 1763.
Sparganophorus Vaillantii Crantz, Inst. 1: 261. 1766.

Erect or spreading, simple or branched, 1 m. high or less, sparingly appressed-pubescent above, otherwise glabrous or very nearly so. Leaves lanceolate to

elliptic, acuminate at both ends, 5–12 cm. long, 1–4 cm. wide, rather finely serrate, the slender petioles 1–2 cm. long; heads 6–9 mm. wide, solitary or clustered in the axils; bracts of the involucre acuminate-aristate, narrowly scarious-margined; achenes oblong-obpyramidal, about 1.5 mm. long; pappus-crown tubular, nearly white, one-third to one-half as long as the achene.

Wet or moist grounds at lower elevations, Porto Rico; St. Thomas (according to Eggers); St. Croix;—Jamaica; Cuba; Hispaniola; Guadeloupe; Trinidad; tropical Africa. YERBA DE FAJA.

2. *VERNONIA* Schreb. Gen. 2: 541. 1791.

Erect branching perennial herbs, vines or shrubs, with alternate (very rarely opposite), leaves and discoid cymose-paniculate heads of purple, pink or white tubular flowers. Involucre hemispheric, campanulate or oblong-cylindric, its bracts imbricated in several or many series. Receptacle flat, naked. Corolla regular 5-cleft. Anthers sagittate at the base, not caudate. Style-branches subulate, hispidulous their whole length. Achenes 8–10-ribbed, truncate. Pappus in 2 series, the inner of numerous roughened capillary bristles, the outer of much shorter small scales or stout bristles. [Named after William Vernon, English botanist.] Over 500 species, of wide distribution, most abundant in South America. Type species: *Serratula noveboracensis* L.

Shrubs or woody vines.

Cymes short, dense.

Cymes elongated.

Leaves thin in texture; inflorescence not flexuous.

Leaves firm in texture, subcoriaceous; inflorescence flexuous.

Herbaceous annual.

1. *V. albicaulis*.

2. *V. sericea*.

3. *V. borinquensis*.

4. *V. cinerea*.

1. *Vernonia albicaulis* Pers. Syn. 2: 404. 1807.

Vernonia Vahlia Less. Linnaea 4: 306. 1829.

Vernonia thomae Benth.; Oerst. Vid. Medd. 1852: 66. 1852.

Cacalia thomae Kuntze, Rev. Gen. Pl. 324. 1891.

Vernonia longifolia Vahlia Urban, Symb. Ant. 1: 456. 1899.

Vernonia longifolia Sintenisii Urban, loc. cit. 1899.

Vernonia Sintenisii Gleason, Bull. N. Y. Bot. Gard. 4: 187. 1906.

A shrub, up to 2 m. high, the branches slender, the twigs densely and finely whitish tomentose. Leaves oblong to elliptic or elliptic-obovate, 7 cm. long or less, 0.6–4 cm. wide, rather thin in texture, punctate, more or less pubescent, entire-margined, obtuse or emarginate at the apex, rounded or narrowed at the base, the petioles 1–3 mm. long; inflorescence of small dense corymbs, the nearly sessile heads secund; involucre 4–6 mm. high, its bracts oblong-lanceolate, acuminate, pubescent; loosely imbricated; achenes 2–3 mm. long, densely pubescent; pappus brown or tawny. [*V. punctata* of Eggers and of Millsbaugh; (?) *Conyza fruticosa* of West; *V. arborescens* of Stahl, not of Grisebach.]

Shaded hillsides at lower and middle elevations in dry districts, Porto Rico; De-secheo; Vieques; St. Croix; St. Thomas; St. Jan; Virgin Gorda;—St. Eustatius; recorded from Hispaniola. SANTA MARIA.

2. *Vernonia sericea* L. C. Rich. Act. Soc. Hist. Nat. Paris 1: 112. 1792.

Lepidaploa phyllostachya Cass. Dict. Sci. Nat. 26: 16. 1823.

Vernonia Berteriana DC. Prodr. 5: 52. 1836.

Vernonia arborescens Lessingiana Griseb. Fl. Br. W. I. 353. 1861.

Cacalia sericea Kuntze, Rev. Gen. Pl. 971. 1891.

Cacalia arborescens Lessingiana Kuntze, Rev. Gen. Pl. 323. 1891.

Eupatorium sessile Sessé & Moc. Fl. Mex. ed. 2, 182. 1894.

Vernonia phyllostachya Gleason, Bull. N. Y. Bot. Gard. 4: 176. 1906.

Vernonia venusta Gleason, Bull. N. Y. Bot. Gard. 4: 177. 1906.

A shrub, 2 m. high or less, with slender branches and appressed-pubescent twigs. Leaves linear-lanceolate to ovate, thin in texture, 2.5–7.5 cm. long, 1–2.5 cm. wide, entire-margined, acute or acutish at the apex, or perhaps sometimes obtuse, obtuse or narrowed at the base, papillose-pubescent above, silky-pubescent beneath, the petioles 1.5–3 mm. long; cymes elongated, leafy-bracted; heads very nearly sessile; involucre 4–5 mm. high, its bracts narrowly lanceolate, acuminate, sparingly appressed-pubescent or glabrate; flowers white to pink; achenes obpyramidal, about 1.5 mm. long, densely pubescent, pappus brown. [*V. arborescens* of Bello, of Schlechtendal and of Millspaugh, not of Swartz.]

Hillsides, mostly in partial shade, at lower and middle elevations mostly in moist districts, Porto Rico; Vieques; St. Thomas; St. Jan. Recorded from Hispaniola. TAPACAMINO. LONG-SHOOT.

The related plant with obovate or elliptic obtuse leaves and pale violet flowers, recorded by Urban as collected on Monte Llano, near Peñuelas, and indicated by Urban as perhaps a distinct species, requires further investigation.

3. **Vernonia borinquensis** Urban, Symb. Ant. 3: 390. 1903.

Vernonia borinquensis *Stahlii* Urban, loc. cit. 391. 1903.

Vernonia borinquensis *resinosa* Gleason, Bull. Torr. Club 46: 236. 1919.

Vernonia borinquensis *hirsuta* Gleason, Bull. Torr. Club 46: 236. 1919.

A shrub, or woody vine, up to 5 m. long, with slender, terete, often flexuous branches, the young twigs sparingly loosely pubescent. Leaves firm in texture, ovate to oblong-lanceolate, nearly or quite entire, somewhat revolute-margined when old, typically punctate, or epunctate, 6 cm. long or less, 1.5–2 cm. wide, acuminate at the apex, obtuse or rounded at the base, the petiole 2–5 mm. long; cymes elongated, flexuous, leafy, the heads sessile, distant; involucre about 6 mm. high, the bracts narrowly lanceolate, acuminate, glabrous or nearly so; flowers white to pink; achenes 1.5–2 mm. long, typically densely pubescent, sometimes glabrous; pappus tawny. [Referred by Stahl to *V. arborescens divaricata* and by Bello to *V. rigida* Sw.]

Hillsides, woodlands and thickets at middle elevations in moist districts, Porto Rico. Endemic.

4. **Vernonia cinerea** (L.) Less. Linnaea 4: 291. 1829.

Conyza cinerea L. Sp. Pl. 862. 1753.

Annual, simple or little-branched, erect, 3–10 dm. high, appressed-pubescent, leafy nearly to the base. Leaves flaccid, ovate to lanceolate, repand or entire, acute or obtuse, the lower petioled, 4–7 cm. long, the upper much smaller and sessile; heads numerous, slender-peduncled, in terminal compound leafless cymes; involucre about 3.5 mm. high, its bracts narrowly lanceolate, sharply acuminate, pubescent, the outermost minute; flowers purple; achenes pubescent; pappus white.

Waste and cultivated grounds, Porto Rico; St. Croix; St. Thomas; Tortola;—Florida; Bahamas; Jamaica; Cuba; Hispaniola; Montserrat; Guadeloupe; Grenada; Barbados; Panama; native of the Old World tropics, and has become a troublesome weed in Porto Rico and other West Indian islands.

3. **PIPTOCOMA** Cass. Bull. Soc. Philom. 1817: 10. 1817.

A finely tomentose-lepidote shrub with slender nearly terete branches, alternate, petioled entire leaves and small heads of tubular blue or pinkish flowers in terminal corymbs. Receptacle nearly flat, naked. Involucre-bracts imbricated in several series, firm in texture, the outer shorter than the inner and tomentose. Corolla with a slender tube and a narrow limb. Anthers sagittate. Achenes striate, 5-angled. Pappus an outer series of about 10 oblong scales, and an

inner series of narrower caducous ones. [Greek, referring to the caducous inner pappus-scales.] A monotypic West Indian genus.

1. **Piptocoma rufescens** Cass. Bull. Soc. Philom. 1817: 10. 1817.

A shrub, 1–2.5 m. high, the twigs angled. Leaves ovate to oblong or oblong-lanceolate, 5–8 cm. long, 2.5 cm. wide or less, obtuse or acutish at the apex, narrowed at the base, dark green above, finely whitish tomentose and strongly veined beneath, the petioles less than 1 cm. long; corymbs 4–10 cm. broad; heads numerous, sessile or on angled peduncles; involucre about 6 mm. high, campanulate, its inner bracts acutish, tomentose at the tip, the outer obtuse, tomentose all over; achenes about 2 mm. long; pappus yellowish, 5 mm. long.

Shaded hillsides, Cabeza San Juan and on serpentine hillsides in the western districts of Porto Rico; Water Island, St. Thomas; St. Jan; Tortola; Virgin Gorda:—Hispaniola.

4. **PIPTOCARPHA** R. Br.; Cass. Dict. Sci. Nat. 41: 109. 1826.

Shrubs, sometimes climbing, with alternate petioled nearly or quite entire leaves stellate-tomentose or lepidote beneath, and small terminal or axillary, paniced or corymbose heads of tubular flowers. Involucre ovoid or campanulate, its bracts imbricated in several series; corolla 5-cleft; anthers subcaudate at the base; achenes truncate, ribbed; pappus mostly of two series of bristles, the outer series shorter than the inner, sometimes inconspicuous. [Greek, deciduous scales.] About 30 species, natives of tropical America. Type species: *Piptocarpa brasiliensis* Cass.

1. **Piptocarpa tetrantha** Urban, Symb. Ant. 1: 457. 1899.

Climbing, up to 10 m. long; twigs somewhat angular, ashy-lepidote. Leaves oblong-lanceolate to elliptic, sparingly few-toothed or entire, subcoriaceous, obtuse or bluntly acute at the apex, obtusely inequilateral or subcordate at the base, densely whitish-lepidote beneath, 12 cm. long or less, 2–5 cm. wide, the petioles 6–15 mm. long; heads 4-flowered, clustered in terminal panicles; involucre 6–7 mm. long, its outer bracts short, ovate, the inner ones lanceolate, obtusish, deciduous with the achenes; receptacle naked; inner pappus-bristles 4–5 times as long as the outer; corolla white; achenes about 4 mm. long, 10-ribbed. [*P. triflora* of Cook & Collins, not of Benn.]

Mountain woodlands, Porto Rico, at middle and higher elevations. Endemic.

5. **ELEPHANTOPUS** L. Sp. Pl. 814. 1753.

Perennial rigid pubescent herbs, with alternate or basal, simple, pinnately-veined leaves, and glomerate bracted heads of blue, whitish or purple tubular flowers in branching corymbs. Heads 2–5-flowered. Involucre compressed, oblong, its chaffy bracts imbricated in about 2 series, the 4 outer bracts shorter. Bracts of the glomerules large, foliaceous. Receptacle small, naked. Corolla nearly regular, 5-lobed, but a little deeper cleft on the inner side. Achenes 10-ribbed, truncate. Pappus of rigid persistent awn-like scales or bristles in 1 or 2 rows. [Greek, ivory, or Elephant's-foot.] About 14 species, natives of tropical or warm regions. Type species *Elephantopus scaber* L.

1. **Elephantopus mollis** H.B.K. Nov. Gen. 4: 26. 1820.

Hirsute-pubescent, or appressed-pubescent above, usually branched, 2–10 dm. high. Lower leaves broadly oblong to obovate, sometimes 2 dm. long,

obtuse at the apex, narrowed or long-attenuate at the base, finely crenate, roughish above, soft-pubescent beneath; upper leaves much smaller, ovate to lanceolate, acute, sessile; clusters of heads long-stalked, loosely paniculate, their bracts orbicular-ovate, about 1 cm. long, abruptly acute; heads usually 3–5 together; involucre about 9 mm. high, its longer bracts lanceolate, spinulose-acuminate; corolla whitish; pappus-bristles dilated below, about 7 m. long. [*E. scaber* of Bello, of Cook and Collins and of Kuntze, not of Linnaeus; *E. tomentosus* of Millspaugh and of Cook and Collins, not of Linnaeus.]

Fields, banks and thickets, Porto Rico, at lower and middle elevations; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; West Indies (except Bahamas); continental tropical America. LENGUA DE VACA.

6. **PSEUDELEPHANTOPUS** Rohr, Skr. Nat. Selsk. 2: 213. 1792.

Erect branched perennial herbs, with leafy stems and small glomerate heads of white tubular flowers in paniced spikes, the glomerules subtended by 2 or 3 bracts. Heads 4-flowered. Involucre of 4 pairs of bracts, the first and third pair conduplicate, the outer bracts shorter than the inner. Corolla-tube slender. Achenes flattened, 10-striate. Pappus of a single series of 5–15 bristles, the two lateral bristles longer and thicker than the others and contorted at the tip. [Greek, false-*Elephantopus*.] Two species, the following typical, the other Bolivian.

1. **Pseudelephantopus spicatus** (Juss.) Rohr. Skr. Nat. Selsk. 2: 213. 1792.

Elephantopus spicatus Juss.; Aubl. Pl. Guian. 2: 808. 1775.

Distreptus spicatus Cass. Dict. Sci. Nat. 13: 367. 1819.

Elephantopus glaber Sessé & Moc. Fl. Mex. ed. 2, 197. 1894.

Stem glabrous or nearly so, 1 m. high or less, the branches loosely pubescent with long appressed hairs. Leaves punctate, pubescent on the veins beneath, the lower and basal ones spatulate to obovate, crenate or entire, 6–15 cm. long, mostly obtuse, the upper linear or linear-lanceolate, acute, entire, much smaller; heads narrowly oblong, usually 2–4 in the glomerules; involucre 8–12 mm. long, its bracts lanceolate, aristate-acuminate, whitish-margined.

Fields, banks and hillsides, Porto Rico, at lower and middle elevations; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—West Indies (except Bahamas); continental tropical America; Philippine Islands. YERBA DE BURRO.

7. **ROLANDRA** Rottb. Coll. Soc. Med. Havn. 2: 256. 1775.

A virgate stiff perennial herb, with alternate entire short-petioled leaves, white-tomentose beneath, and numerous 1-flowered heads in dense axillary and terminal globose glomerules, the bracts aristate. Involucre of 2 aristate bracts, the outer one the larger. Corolla regular, its tube slender, its limb 3-toothed or 4-toothed. Anthers sagittate, with long auricles. Achenes angled, truncate. Pappus a lacerate crown. [Commemorates Dr. Rolander, who travelled in Surinam.] A monotypic genus of tropical America.

1. **Rolandra fruticosa** (L.) Kuntze, Rev. Gen. Pl. 360. 1891.

Echinops fruticosus L. Sp. Pl. 815. 1753.

Rolandra argentea Rottb. Coll. Soc. Med. Havn. 2: 258. 1775.

Stem divergently branched, or simple, terete, appressed-pubescent with whitish hairs, at least above, 3–8 dm. tall. Leaves oblong-lanceolate to elliptic, scabrate above, white-woolly and with long hairs on the veins beneath, acute at both ends, or obtusish at the base, firm in texture, 5–10 cm. long, 1–4.5 cm. wide; glomerules sessile in the axils and at the end of the stiff branches, about 1.5 cm

in diameter; aristae of the bracts abruptly bent at the apex; corolla white; achene oblong-turbinate.

Banks, thickets and hillsides, Porto Rico, at lower and middle elevations:—Antigua to Trinidad; continental tropical America. YERBA DE PLATA.

8. **ADENOSTEMA** Forst. Char. Gen. 89. 1776.

Herbs, with petioled, usually triplinerved leaves, and rather small discoid corymbose heads of white tubular flowers. Involucre broadly campanulate or hemispheric, its herbaceous bracts imbricated in about 2 series. Receptacle nearly flat, naked. Corolla regular, the limb 5-toothed. Anthers obtuse at the base, not appendaged. Achenes glandular-tuberculate, obtuse, 5-ribbed. Pappus of a few short stiff, often clavate, gland-like bristles. [Greek, gland-crown, referring to the pappus.] About 10 species or more, natives of tropical regions. Type species: *Adenostema viscosa* Forst.

1. **Adenostema Verbesina** (L.) Kuntze, Rev. Gen. Pl. 304. 1891.

Cotula Verbesina L. Syst. ed. 10, 1222. 1759.

Adenostemma Swartzii Cass. Dict. Sci. Nat. 25: 362. 1822.

Stems slender, sparingly pubescent or glabrous, weak, ascending, rooting at the lower nodes, 2–4 dm. long. Leaves ovate, rhomboid-ovate or ovate-orbicular, thin, glabrate, 2–5 cm. long, dentate or subentire, acute or obtuse, the base obtuse or subtruncate, somewhat decurrent on the petiole; heads few, slender-peduncled, 6–8 mm. broad; involucre about 5 mm. high, its oblanceolate bracts ciliate at the apex; achenes 3–4 mm. long.

Woodlands near Barranquitas, Porto Rico, at 800 m. elevation, collected only by Stahl;—Jamaica; Cuba; Hispaniola; St. Kitts; St. Vincent; South America. Recorded by Krebs from St. Thomas, presumably in error.

9. **AGERATUM** L. Sp. Pl. 839. 1753.

Herbs, or some continental species shrubs, with mostly opposite leaves and small terminal, corymbose or cymose heads of blue, purple or white tubular flowers. Involucre campanulate to hemispheric, its nearly equal bracts imbricated in 2 or 3 series, sometimes with 1–3 smaller outer ones. Receptacle flat to conic. Corolla expanded above, 5-toothed. Anthers linear or oblong. Achenes prismatic, 5-angled. Pappus of scales or coronate. [Name ancient, not originally applied to these plants.] About 25 species, one African, the others of warm and tropical America. Type species: *Ageratum conyzoides* L.

1. **Ageratum conyzoides** L. Sp. Pl. 839. 1753.

Carelia conyzoides robusta Kuntze, Rev. Gen. Pl. 325. 1891.

Eupatorium paleaceum Sessé & Moc. Fl. Mex. ed. 2, 181. 1894.

Annual, more or less pubescent, branched, 9 dm. high or less, the stem terete, the branches widely ascending. Leaves thin, ovate, 2–8 cm. long, mostly obtuse at the apex, cuneate to subcordate at the base, crenate or crenate-dentate, the slender hirsute petioles 3 cm. long or less; corymbs compound, convex, the heads several to numerous, about 6 mm. broad, many-flowered; involucre campanulate, its bracts oblong, glabrous or slightly pubescent, green with scarious margins, acuminate; receptacle naked; corolla blue or white; achenes black; shining; pappus of 1–5 lanceolate scales attenuate at the apex, sometimes very unequal in length and the shorter ones bluntish.

Banks, moist grounds and waste places, Porto Rico, at lower and middle elevations; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—West Indies; tropical continental America; Old World tropics and subtropics. YERBA DE CABRIO.

Ageratum Houstonianum Mill., Mexican, occasionally grown in Porto Rican flower gardens, has larger heads of blue flowers, the pubescent involucre-bracts attenuate. [*A. mexicanum* Sims.]

10. **HEBECLINIUM** DC. Prodr. 5: 136. 1836.

A tall perennial puberulent herb, with terete stems and branches, large long-petioled broadly ovate leaves, and large terminal corymbs of small heads, the flowers white. Involucre imbricated, the scales in about 4 series, pubescent, strongly 3-5-striate. Receptacle convex, pilose. Corollas slender. Achenes angled. Pappus of a single series of roughish bristles. [Greek, referring to the hairy receptacle.] A few species of tropical America, the following typical.

1. **Hebeclinium macrophyllum** (L.) DC. Prodr. 5: 136. 1836.

Eupatorium macrophyllum L. Sp. Pl. ed. 2, 1175. 1763.

Branched. 3 m. high or less, the stems rather stout, little woody. Leaves thin, flaccid, 7-20 cm. long, often as broad as long, 3-nerved and pinnately veined, densely puberulent and pale green beneath, darker green and sparingly puberulent above, crenate, acuminate at the apex, subcordate at the base, the puberulent petioles about half as long as the blades; heads oblong-campanulate, 3-4 mm. long, usually very numerous, in dense compound corymbs; outer scales of the involucre short, ovate, the inner lanceolate; achenes glabrous; pappus whitish, about twice as long as the achene.

Woodlands and river-banks, Porto Rico, in moist or wet districts, ascending into the Luquillo Mountains:—St. Croix; St. Thomas;—West Indies (except Bahamas); continental tropical America. TURMA TORO.

11. **OSMIA** Sch. Bip. Pollichia 22-24: 251. 1866.

Small trees, shrubs, rarely perennial herbs, with opposite petioled leaves, the discoid heads corymbose-paniculate. Involucre cylindric or ovoid, many-flowered, its numerous bracts striate-nerved, obtuse, or the inner acute, imbricated in several series. Receptacle flat or convex, naked. Corollas tubular, regular. Anthers obtuse and entire at the base. Achenes ribbed. Pappus of capillary bristles. [Greek, odorous.] Perhaps 100 species, natives of tropical America. Type species *Eupatorium odoratum* L.

Involucre 7-12 mm. long; leaves green beneath.

Leaves dentate, crenate, or the upper entire.

Leaves long, thin, acuminate; involucre 8-12 mm. long.

Leaves small, fleshy, acute to obtuse; involucre 7-9 mm. long.

Leaves deeply lobed, densely pubescent.

Involucre about 5 mm. long.

Leaves ovate, whitish-canescens beneath.

Leaves oblong to lanceolate, green on both sides.

Branches loosely pubescent; leaves oblong to lanceolate.

Glabrous throughout; leaves triangular-lanceolate.

1. *O. odorata*.

2. *O. corymbosa*.

3. *O. geraniifolia*.

4. *O. sinuata*.

5. *O. ivaefolia*.

6. *O. borinquensis*.

1. **Osmia odorata** (L.) Sch. Bip. Pollichia 22-24: 251. 1866.

Eupatorium odoratum L. Syst. ed. 10, 1205. 1759.

Shrubby, much branched, more or less pubescent, erect, or in thickets half-climbing, 1-3 m. high. Leaves thin, ovate to ovate-lanceolate, 5-15 cm. long, 3-nerved, dentate, often with large acute teeth, acuminate at the apex, usually cuneate at the base, the slender petioles 1-4 cm. long; heads in terminal corymbs 5-10 cm. broad, cylindric, 8-12 mm. long; involucre-bracts imbricated in about 4 series, striate-nerved glabrous or nearly so, shining, all obtuse or the inner acute or acutish; flowers 10-20, white to blue, achenes rough-angled.

Banks, hillsides and thickets, Porto Rico, at lower and middle elevations; Vieques-Culebra; St. Croix; St. Thomas; St. Jan; Tortola:—Florida; West Indies; tropical continental America. SANTA MARIA. BITTER-BUSH.

2. *Osmia corymbosa* (Aubl.) Britton & Wilson.

Eupatorium corymbosum Aubl. Pl. Guian. 2: 799. 1775.

Eupatorium atriplicifolium Lam. Encycl. 2: 407. 1788.

Eupatorium repandum Willd. Sp. Pl. 3: 1767. 1804.

Shrubby, finely pubescent, branched, 1 m. high or less. Leaves thick and fleshy, ovate, 1.5–3.5 cm. long, acute or obtuse at the apex, subtruncate to cordate at the base, crenate or crenate-dentate, densely punctate, finely pubescent beneath, nearly glabrous above, the pubescent petioles 5–10 mm. long; heads in small terminal dense corymbs; involucre 7–9 mm. long, its bracts imbricated in about 5 series, pubescent, at least at the obtuse tips, finely striate; flowers bright blue; achenes rough-angled. [*Erigeron atriplicifolium* of Millspaugh.]

Coastal hills near Quebradillas, Porto Rico; St. Thomas; St. Croix; St. Jan; Tortola Virgin Gorda:—Bahamas; Hispaniola; Martinique.

3. *Osmia geraniifolia* (Urban) Britton & Wilson.

Eupatorium geraniifolium Urban, Symb. Ant. 1: 458. 1899.

A shrub up to 1.5 m. high, the twigs and foliage densely pubescent. Leaves ovate in outline, 2–6 cm. long, deeply lobed or cleft into 3 segments and these again lobed or very coarsely toothed, dark green above, paler beneath, the lobes obtuse or minutely apiculate; petioles 2 cm. long or less; lower leaves sometimes with small dense entire leaves at their axils; heads in small dense terminal corymbs; involucre 7–8 mm. long, oblong-cylindric; its bracts imbricated in 4 or 5 series, obtuse, 3-striate, pilose; flowers blue; achenes minutely hairy.

Mountain forests and hillsides in the central districts of Porto Rico. Endemic.

4. *Osmia sinuata* (Lam.) Britton & Wilson.

Eupatorium sinuatum Lam. Encycl. 2: 407. 1788.

A shrub, 2 m. high or less, with slender canescent branches and twigs. Leaves ovate, thin, 0.5–3 cm. long, entire or with few blunt teeth, rounded or obtuse at the apex, rounded, truncate or cuneate at the base, 3-nerved, rather bright green above, pale and densely canescent beneath, the petioles 2–8 mm. long; heads oblong-cylindric, in small terminal corymbs; involucre about 5 mm. long, its bracts in about 4 series, striate, obtuse or the inner acute, pubescent, at least at the tips; flowers white; achenes pubescent.

Banks, hillsides and thickets, Porto Rico, at lower elevations in dry and relatively moist districts; Culebra; Vieques; St. Croix; St. Jan; St. Thomas; Virgin Gorda:—Cuba Hispaniola; St. Eustatius to Guadeloupe.

5. *Osmia ivaefolia* (L.) Sch. Bip. Pollichia 22–24: 252. 1866.

Eupatorium ivaefolium L. Syst. ed. 10, 1205. 1759.

A shrub, 5–15 dm. high, often much branched, the slender branches loosely pubescent. Leaves oblong to oblong-lanceolate or linear-lanceolate, dentate or the upper entire, 5–8 cm. long or shorter, acute, the base mostly narrowed, the petioles short; involucre about 5 mm. long, 10–20-flowered, its bracts oblong or linear-oblong; flowers purple; achenes about 2 mm. long, glabrous or nearly so, angled.

Monte Mesa, Mayaguez, Porto Rico:—southern United States; Cuba; Hispaniola; Guadeloupe; Martinique; Tobago; Trinidad; continental tropical America.

6. *Osmia borinquensis* Britton, sp. nov.

A straggling vine-like shrub, about 2 m. long or shorter, the slender branches glabrous. Leaves triangular-lanceolate, 3–5 cm. long, glabrous, chartaceous, sharply few-toothed below the middle, the apex acuminate, the base broadly cuneate, the petioles 3–5 mm. long; heads few or several in terminal corymbs,

their slender peduncles 10–15 mm. long; young involucre about 4 mm. long, its bracts striate, glabrous, obtuse or rounded, imbricated in about 4 series, the outer much smaller than the inner; achenes glabrous, about 3.5 mm. long.

Limestone cliffs near Lares, on the road to Arecibo, Porto Rico. Type collected by Britton and Boynton, no. 8486, April 5, 1925. Endemic.

Osmia macrantha (Sw.) Sch. Bip. [*Eupatorium macranthum* Sw.] of the Lesser Antilles was recorded by Krebs from St. Thomas, apparently in error.

12. **EUPATORIUM** L. Sp. Pl. 836. 1753.

Herbs, shrubs or trees, with opposite or verticillate, or sometimes alternate, often punctate leaves, and corymbose or cymose-paniculate discoid heads of white, blue or purple flowers. Involucre ovoid, campanulate, or hemispheric, the bracts imbricated in 1 to 3 series. Receptacle naked. Corolla regular, its tube slender, its limb 5-lobed or 5-toothed. Anthers obtuse and entire at the base. Achenes 5-angled, truncate. Pappus of numerous capillary usually scabrous bristles arranged in 1 row. [Named for Mithridates *Eupator*, i.e., of a noble father.] Over 500 species, mostly of warm or tropical regions. Type species: *Eupatorium cannabinum* L.

Leaves elongated oblong-lanceolate, entire or nearly so.
Leaves ovate to lanceolate, dentate or crenate.

1. *E. triplinerve*.

Plants not resinous.

Shrubs with thick leaves.

Leaves broadly ovate, cordate, scabrous.

Leaves ovate-lanceolate, not cordate.

Short-villous, heads short-peduncled.

Puberulent; heads filiform-peduncled.

Annual herb with thin leaves.

Twigs and leaves viscid-resinous.

2. *E. polyodon*.

3. *E. dolicholepis*.

4. *E. droserolepis*.

5. *E. microstemon*.

6. *E. resinifluum*.

1. **Eupatorium triplinerve** Vahl, Symb. 3: 97. 1794.

Eupatorium Ayapana Vent. Jard. Malm. 3. 1803.

Perennial, stoloniferous, woody below, somewhat branched, glabrous or sparingly pubescent above, 1–1.5 m. high. Leaves lanceolate to oblong-lanceolate, entire or very nearly so, sessile or short-petioled, acuminate at both ends, triple-nerved from below the middle, 5–15 cm. long, 3 cm. wide or less; heads few, in loose corymbs; involucre subcampanulate, 5–6 mm. high, its bracts in 1–2 series, linear, acuminate, pubescent; achenes 2 mm. long, glabrous.

Escaped from cultivation into woodlands at higher elevations in Porto Rico; St. Croix:—Martinique; Guadeloupe. Native of continental tropical America. Valued as a febrifuge. CURIA. YAPANA.

2. **Eupatorium polyodon** Urban, Symb. Ant. 1: 462. 1899.

A shrub up to 6 m. in height, the twigs rough-puberulent. Leaves broadly ovate or ovate-elliptic, 4–11 cm. long, 2–7 cm. wide, 3-nerved, acute or short-acuminate at the apex, cordate or subtruncate at the base, firm in texture, low-crenate or dentate, scabrous above, glandular beneath and pubescent on the veins, the stout petioles 5–15 mm. long; heads numerous in loose terminal corymbs; involucre about 4 mm. long, its bracts in 2 series, linear, acute, pubescent; corolla white or rose; achenes 5-ribbed, glabrous, slightly glandular. [*E. cordifolium* of Bello, not of Swartz; *E. triste* of Stahl.]

Woodlands and thickets, Porto Rico, at lower and middle altitudes in moist districts. Endemic.

3. **Eupatorium dolicholepis** (Urban) Britton.

Eupatorium villosum dolicholepis Urban, Symb. Ant. 1: 462. 1899.

A fragrant shrub, 1–4 m. high, with slender ascending branches, the twigs and branches of the inflorescence densely pubescent. Leaves ovate-lanceolate,

6 cm. long or less, 1–3 cm. wide, acute or bluntly acuminate at the apex, rounded at the base, 5-nerved, low-dentate with distant teeth, rather thick, roughish above, puberulent beneath, at least on the veins, the petioles 8 mm. long or less; heads in small, rather loose, terminal corymbs; involucre about 5 mm. long, its bracts in 2–3 series; linear, pubescent, obtuse or acutish; flowers white, achenes pubescent.

Hillsides and thickets at lower and middle elevations in moist parts of the central and western districts of Porto Rico:—Cuba. OREGANILLO.

4. **Eupatorium droserolepis** Robinson, Proc. Am. Acad. 54: 243. 1918.

A shrub, about 1 m. high or lower, the nearly terete branches slender, the young twigs and inflorescence puberulent. Leaves ovate to ovate-lanceolate, thin, 3–7 cm. long, or the upper ones much smaller, glabrate, dentate or crenate-dentate, acuminate, the base rounded, subtruncate or subcordate, the slender petioles about 1.5 cm. long or shorter; panicles diffuse, widely branched, the nearly filiform peduncles 5–25 mm. long; involucre subcampanulate, 6 mm. high, about 11-flowered, its linear oblong bracts imbricated in about 2 series; corolla 3.5 mm. long; achenes 2 mm. long, glabrous when mature; pappus-bristles numerous, brownish, unequal.

Summit of Monte Torrecillo and near Utuado, Porto Rico. Endemic.

5. **Eupatorium microstemon** Cass. Dict. Sci. Nat. 25: 432. 1822.

Eupatorium paniculatum Schrad. Com. Soc. Sci. Gotting. 6: 130. 1827.

Eupatorium guadalupense DC. Prodr. 5: 170. 1836.

E. microstemon albiflorum Kuntze, Rev. Gen. Pl. 338. 1891.

Annual, herbaceous, glabrous, or sparingly puberulent, erect, weak, often much branched, 1 m. high or less. Leaves thin, flaccid, opposite or the upper alternate, ovate, rhombic-ovate or suborbicular, acute to acuminate at the apex, narrowed, subtruncate, or cuneate at the base, 2–8 cm. long, crenate-dentate, 3–5-nerved, the slender petioles often half as long as the blades; corymbs terminal, loose; heads few or numerous; involucre 4–5 mm. high, its linear bracts in 2 series, glabrous, shining, obtuse or mucronate; flowers white; achenes glabrous.

Moist or wet woods and thickets, Porto Rico, ascending to at least 800 m. altitude:—Hispaniola; Jamaica; Saba to Trinidad; continental tropical America.

6. **Eupatorium resinifluum** Urban, Symb. Ant. 1: 461. 1899.

A shrub, 1–2 m. high, the terete branches rather stout, irregularly ascending, glabrous, the young twigs and leaves exuding a viscid resin. Leaves lanceolate to ovate-lanceolate, glabrous, 4–12 cm. long, 4 cm. wide or less, firm in texture, pinnately veined, crenate or serrate, obtuse to acuminate at the apex, mostly rounded at the base, the petioles 4–12 mm. long; heads many, few-flowered, in terminal somewhat pubescent or glabrous corymbs often 8 cm. broad; involucre about 5 mm. high, few-flowered, the bracts only 5 or 6 in 1 series, linear-oblong, obtuse, or 1 of them shorter and acute; corollas white; achenes hispid on the angles.

Hillsides at middle elevations, central and western districts of Porto Rico apparently local. Endemic.

Eupatorium capillifolium (Lam.) Small, cultivated on St. Croix, according to Millspaugh, is a species of the southeastern United States, the erect stem 1–3 m. high, the mostly alternate leaves dissected into linear-filiform segments, the small heads in panicles. [*E. foeniculaceum* Willd.]

Eupatorium cuneifolium Willd., cited by Eggers from de Candolle (Prodr. 5: 177) as from St. Thomas, was not from our island St. Thomas.

13. **CRITONIA** [P. Br.] Ludwig, Def. Gen. 157. 1760.

Shrubs or small trees, with opposite, petioled dentate pellucid-lineolate or punctate leaves, and small heads of discoid flowers glomerate on the branches of terminal corymbs. Involucre cylindric or oblong, its bracts imbricated in 3-5-series. Flowers 3-5, the corolla clavate. Achenes 5-angled. Pappus-bristles pilose. [Named for Criton, a physician of ancient Greece.] A few species, natives of the West Indies. Type species: *Eupatorium Dalea* L.

1. **Critonia portoricensis** (Urban) Britton and Wilson.

Eupatorium portoricense Urban, Symb. Ant. 1: 459. 1899.

A small glabrous tree, 3-6 m. high, with a trunk 1.5 dm. in diameter or more, sometimes lower and shrubby. Leaves elliptic to ovate-elliptic, rather thin in texture, fragrant, 7-16 cm. long, 8 cm. wide or less, dentate or crenate-dentate, pinnately veined, acute, short-acuminate or obtuse at the apex, copiously punctate with pellucid lines and dots, the petioles 1.5 cm. long or less; heads numerous, sessile in clusters in large terminal corymbs; involucre oblong, 6-7 mm. high, its bracts in 4 or 5 series, striate, obtuse, the outer ovate, the inner oblong; flowers about 5 in each head, white; achenes hairy. [*Critonia Dalea* of Bello, not of de Candolle; *Eupatorium Dalea* of Cook and Collins, not of Linnaeus; *Critonia parviflora portoricensis* of Cook and Collins.]

Hillsides, woodlands and coastal thickets, northern, central and western districts of Porto Rico; sometimes planted for its fragrant foliage; Vieques. Endemic. GUERRERO.

14. **MIKANIA** Willd. Sp. Pl. 3: 1742. 1804.

Herbaceous twining vines, or some South American species shrubs, with opposite petioled leaves, and discoid, mostly corymbose or corymbose-paniculate heads of white or pink flowers. Heads 4-flowered. Involucre oblong, of 4 slightly unequal narrow bracts. Receptacle small, naked. Corolla regular, its tube slender, the limb campanulate, 5-cleft. Achenes truncate, 5-angled. Pappus of numerous capillary roughish bristles in 1 or 2 series. [In honor of Joseph Gottfried Mikan, 1743-1814 professor at Prague.] About 150 species, natives of America. Type species: *Mikania hastata* (L.) Willd. The species are known as GUACO in Porto Rico.

Inflorescence elongated, paniculate, the heads sessile or nearly so in spikes or glomerules.

Leaves thin, entire or nearly so, 6 cm. long or less.

Leaves thick, dentate, 4-6 cm. long.

Inflorescence corymbose, or corymbose-paniculate.

Leaves thin, entire or merely toothed.

A pair of foliaceous, stipule-like organs at the nodes.

No stipule-like organs at the nodes.

Involucre 6-9 mm. long; corolla-lobes lanceolate.

Inflorescence, twigs and under surfaces of the leaves pubescent; corolla-lobes revolute.

Glabrous or very nearly so; corolla-lobes flat.

Involucre 3.5-5 mm. long; corolla-lobes ovate

Leaves thick, very rough, sharply 3-lobed, the middle lobe acuminate.

1. *M. porosa*.

2. *M. pachyphylla*.

3. *M. fragilis*.

4. *M. cordifolia*.

5. *M. odoratissima*.

6. *M. congesta*.

7. *M. Stevensiana*

1. **Mikania porosa** Urban, Symb. Ant. 1: 465. 1899.

Willughbaeya porosa Cook & Collins, Contr. U. S. Nat. Herb. 8: 264. 1903.

Glabrous, climbing on trees to at least 8 m., the branches striate, the internodes long. Leaves thin, ovate to oblong, 0.5-6 cm. long, 3 cm. wide or less, entire or nearly so, or sometimes 3-lobed, 3-nerved, obtuse to acuminate at the apex, rounded at the base, the petioles 3-15 mm. long; inflorescence elongated,

sometimes 3 dm. long, drooping, paniculate, the heads sessile or nearly so in spikes or glomerules; bracts of the inflorescence 2–3 mm. long; involucre 3–3.5 mm. long, its bracts oblong, obtuse; corolla white, the limb narrowly campanulate, the lobes triangular-ovate; achenes glabrous; pappus-bristles about 30. [*M. Swartziana* of Stahl, not of Grisebach.]

Thickets and forests, Porto Rico in moist or wet regions, ascending to at least 600 m. Endemic.

2. *Mikania pachyphylla* Urban, Symb. Ant. 1: 463. 1899.

Branches angulate-striate, glabrous. Leaves estipulate, ovate, 4–6 cm. long, remotely dentate or nearly entire, thick, coriaceous, acuminate, the base rounded, the petioles 6–12 mm. long; inflorescence short-stalked, paniculate, 3–12 cm. long; heads short-pedicelled; bracts of the inflorescence lanceolate, 2–3 mm. long; involucre about 2.5 mm. long, its linear-oblong bracts obtuse; achenes 2 mm. long, glabrous; pappus-bristles 24–30.

Summit of Mt. Yunque, Luquillo Mountains. Endemic.

3. *Mikania fragilis* Urban, Symb. Ant. 1: 464. 1899.

Mikania fragilis leptodon Urban, loc. cit. 1899.

Climbing on trees to at least 6 m., the branches loosely hirsute or pubescent, angular and striate. Nodes bearing a pair of stipule-like expansions, which are reniform to orbicular, strongly veined, obtuse or apiculate, 1 cm. broad or less; leaves ovate-orbicular, 2–8 cm. broad, 5–7-nerved, firm in texture, dentate, cordate at base, acute to obtuse at apex, scabrate above, loosely pubescent at least on the veins beneath; petioles stout, 1–3 cm. long; inflorescence loosely corymbose; pedicels 4–6 mm. long; involucre about 7 mm. long, its bracts linear, obtuse, pubescent; flowers white; achenes glabrous.

Mountain forests, eastern and central districts of Porto Rico. Endemic.

4. *Mikania cordifolia* (L.f.) Willd. Sp. Pl. 3: 1746. 1804.

Cacalia cordifolia L.f. Suppl. 351. 1781.

Mikania gonoclada DC. Prodr. 5: 199. 1836.

Mikania convolvulacea DC. loc. cit. 1836.

Willughbaeya cordifolia Kuntze, Rev. Gen. Pl. 372. 1891.

Willughbaeya gonoclada Millsp. Field Mus. Bot. 1: 536. 1902.

Trailing or climbing, sometimes 4 m. long, the branches pubescent, angular and striate. Leaves ovate, 12 cm. long or less, dentate or undulate, thin and flaccid, 5-nerved, obtuse to acuminate at the apex, cordate to subtruncate at the base, loosely finely pubescent above, densely pubescent beneath, the petioles often nearly as long as the blades; inflorescence corymbose, the corymbs often 12 cm. broad; heads pedicelled; bracts of the involucre 6–9 mm. long, pubescent, acute or acuminate; flowers white; achenes glabrous. [? *Eupatorium denticulatum* of Schlechtendal.]

Hillsides, river-banks and thickets at lower and middle elevations; Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan; Tortola;—southern United States to Paraguay; Jamaica; Cuba; Hispaniola; Guadeloupe; Trinidad.

5. *Mikania odoratissima* Urban, Symb. Ant. 1: 464. 1899.

Willughbaeya odoratissima Cook & Collins, Contr. U. S. Nat. Herb. 8: 264. 1903.

Sparingly pubescent when young, becoming glabrate, the branches slender and striate, the internodes long. Leaves thin, ovate or triangular-ovate, the larger up to 6 cm. long, dentate, 5-nerved, acute or acuminate at the apex,

truncate or subcordate at the base, the slender petioles 4 cm. long or less; upper leaves much smaller than the lower, entire; inflorescence loosely corymbose, the heads pedicelled; involucre about 7 mm. high, its linear-oblong bracts glabrous, or merely puberulent at the acutish tips; achenes glabrous. [*M. convolvulacea* of Stahl not of de Candolle.]

Woodlands in moist parts of the central and western districts of Porto Rico, ascending to higher elevations. Endemic.

6. **Mikania congesta** DC. Prodr. 5: 197. 1836.

Glabrous or nearly so, 1.5–4.5 m. long. Leaves ovate or hastate, deeply cordate, acuminate at the apex, repand or obtusely dentate, 5–10 cm. long, 2–5 cm. wide; petioles slender, shorter than the blades; heads in compound compact corymbs at the ends of the branches; involucre 3.5–5 mm. long, its bracts lanceolate, acuminate or apiculate sometimes puberulent; flowers white or pink; achenes glabrous, resinous. [*Mikania scandens* of authors, not of Willdenow; *Willughbaeya scandens* of Kuntze.]

Marshes, moist thickets and river-banks at lower elevations, Porto Rico:—northern South America. FALSE GUACO.

7. **Mikania Stevensiana** Britton, Bull. Torr. Club 43: 458. 1916.

Climbing to a height of 5 m., the branches glabrous, striate, nearly terete, the twigs angular, sparingly pubescent. Leaves triangular-ovate in outline, firm in texture, brittle when dry, 5 cm. long or less, very scabrous and sparingly short-hispid above, pubescent on the elevated veins beneath, 5-nerved, sharply 3-lobed, the middle lobe triangular-lanceolate, long-acuminate, dentate, 3 or 4 times as long as the acute entire or sparingly toothed lateral ones; petioles sparingly pubescent, 1–2 cm. long; inflorescence corymbose-paniculate; heads pedicelled; bracts of the involucre linear, acute, 7 mm. long; achenes angled, glabrous, 5 mm. long; pappus-bristles about 40; corolla 7 mm. long, as long as the pappus, its lobes acute.

Wooded valley, Maricao River, above Maricao, Porto Rico. Endemic.

8. **Mikania** sp. A vine 3 m. long, the young stems pubescent with scattered hairs, the slender-petioled, pubescent, triangular-ovate leaves 2–3-parted, with the segments deeply several-lobed, or the upper merely coarsely lobed, occurs in the Sierra de Naguabo, but is known only from barren shoots (Britton & Cowell, 2219); similar leaves were collected by Professor Whetzel at Finca Maria, north of Yauco, in 1924.

15. **Egletes** Cass. Bull. Soc. Philom. 1817: 153. 1817.

Low herbs, with alternate dentate or lobed leaves, the rather large peduncled radiate and discoid heads terminal, or opposite the leaves, usually solitary. Involucre subhemispheric, its bracts imbricated in few series. Receptacle ovoid or conic, naked. Ray-flowers perfect, the rays narrow. Disk-flowers regular, tubular, the limb 3–5-lobed. Anthers obtuse and entire at the base. Achenes flattened, oblong, ribless, tipped by a dentate or ciliate cartilaginous ring. [Greek, shining.] A few species of tropical America, the following typical.

1. **Egletes prostrata** (Sw.) Kuntze, Rev. Gen. Pl. 334. 1891.

Matricaria prostrata Sw. Prodr. 114. 1788.

Pyrethrum simplicifolium Willd. Sp. Pl. 3: 2151. 1804.

Egletes domingensis Cass. Dict. Sci. Nat. 14: 265. 1819.

Perennial, prostrate or procumbent, glabrate or villous, 2–5 dm. long, branched. Leaves obovate or spatulate, coarsely dentate above the middle, 2–7 cm.

long, the apex rounded, the base cuneate, the petioles above 2 cm. long, or less, or the upper leaves sessile; involucre about 4 mm. high, its bracts lanceolate; rays white, 4–5 mm. long. [*E. glabratus* of Krebs.]

Sandy shores, St. Thomas:—Hispaniola; Jamaica; St. Kitts to Trinidad; Curaçao; Aruba; Venezuela.

16. **GUNDLACHIA** A. Gray, Proc. Am. Acad. 16: 100. 1880.

Somewhat viscid leafy shrubs, with alternate entire linear to oblanceolate leaves, and numerous small heads of both discoid and radiate white flowers in terminal thyrses or compound corymbs. Ray-flowers few, pistillate; disk-flowers somewhat more numerous, perfect. Involucre obconic, its bracts coriaceous, imbricated in 4 or 5 series, the outer much shorter than the inner. Achenes nearly terete, 5-nerved. Pappus a single series of capillary bristles. [In honor of John Gundlach, 1810–1896, traveller and naturalist.] Six or seven species, natives of the West Indies. Type species: *Solidago domingensis* Spreng.

1. **Gundlachia corymbosa** (Urban) Britton; Boldingh, Fl. Ned. West Ind. 391. 1913.

Gundlachia domingensis corymbosa Urban, Symb. Ant. 3: 406. 1903.

Nearly glabrous, viscid above, bushy-branched, 6–12 dm. high. Leaves oblanceolate to oblong-lanceolate, 3–8 cm. long, 5–20 mm. wide, fleshy, obtuse and rounded at the apex, or emarginate or mucronulate, narrowed at the base, short-petioled, the midvein rather prominent, the lateral veins few and obscure; corymbs dense, convex, 3–10 cm. broad; heads short-peduncled; involucre about 5 mm. high, its bracts acute or acutish, the outer ovate, the inner linear-lanceolate; rays spreading, 4–5 mm. long.

Saline soil, Arecibo District, Porto Rico; Anegada:—Bahamas; Hispaniola; Saba; Montserrat; Desirade; Curaçao; Aruba. SERENO. HORSE-BUSH.

17. **ERIGERON** L. Sp. Pl. 863. 1753.

Branching or scapose herbs, with alternate or basal leaves, and corymbose, paniculate or solitary, peduncled heads, of both tubular and radiate (rarely all tubular) flowers. Involucre hemispheric or campanulate, its bracts narrow, nearly equal, imbricated in 1 to 3 series. Receptacle nearly flat, usually naked. Ray-flowers white, violet or purple, pistillate. Disk-flowers yellow, tubular, perfect, their corollas mostly 5-lobed. Anthers obtuse and entire at the base. Style-branches more or less flattened, their appendages short, mostly rounded or obtuse. Achenes flattened, 1-nerved or 2-nerved. Pappus-bristles, fragile, slender, scabrous or denticulate, in 1 series, or often an additional outer shorter series. [Greck, early-old, alluding to the early hoary pappus.] A genus of 130 species or more, of wide distribution. Type species: *Erigeron acris* L. KNOWN as FLEABANE.

Basal leaves rosulate, those of the scape-like stems much smaller.

Basal leaves suborbicular, the margined petiole longer than the blade; stems filiform.

Basal leaves obovate-cuneate, scarcely petioled; stems slender.

Stem leafy, the upper leaves progressively smaller than the lower, the basal sometimes tufted.

1. *E. bellioides*.

2. *E. cuneifolius*.

3. *E. jamaicensis*.

1. **Erigeron bellioides** DC. Prodr. 5: 288. 1836.

Sparingly and loosely pubescent; rootstock 1–3 cm. long, oblique. Basal leaves thin, tufted, 1–4 dm. long, the blade nearly orbicular or ovate, 4–20 mm.

broad, entire or few-toothed, abruptly narrowed into a long margined petiole; stems usually several, weak, filiform, spreading, or ascending, 10 cm. long or less, bearing a few small spatulate to oblong leaves, simple or with few branches; heads few or solitary, about 5 mm. broad; involucre 3–3.5 mm. high, its linear acute bracts in 1–2 series; rays white, short. [*E. rivulare* of Sprengel, not of Swartz.]

Moist grassy places, waste and cultivated grounds and stream-banks, Porto Rico, at lower and middle elevations; Vieques:—Cuba; Hispaniola. Porto Rico is the type locality. BELLORITA.

2. ***Erigeron cuneifolius*** DC. Prodr. 5: 288. 1836.

Pubescent; rootstock short, slender, oblique. Basal leaves tufted, cuneate-obovate to oblanceolate, 1.5–6 cm. long, obtuse at the apex, few-toothed or entire, scarcely petioled; stems solitary or several, simple or branched, slender, erect or ascending, 1–3 dm. long; stem-leaves few and distant, small, oblong or oblanceolate, rarely over 1.5 cm. long; heads solitary or several, about 7 mm. broad; involucre about 5 mm. high, its linear-lanceolate acuminate bracts scarious-margined; rays narrow, white, a little longer than the disk flowers. [*E. jamaicensis* of Swartz and of Krebs, not of Linnaeus.]

Moist banks, rocks and hillsides, Porto Rico, at lower and middle altitudes; St. Thomas; St. Jan; Tortola:—Jamaica; Cuba; Hispaniola. Porto Rico is the type locality.

3. ***Erigeron jamaicensis*** L. Syst. ed. 10, 1213. 1759.

Erigeron rivularis Sw. Prodr. 113. 1788.

Pubescent; rootstock short or elongated; stems slender, usually somewhat branched, erect or nearly so, 1–3 dm. high, leafy. Leaves spatulate or oblong-spatulate, pinnately lobed or coarsely toothed, 3–10 cm. long, 3–15 mm. wide, the lower ones somewhat tufted, acute or obtuse at the apex, narrowed into margined petioles, the upper smaller, often entire, linear to oblong; heads few or several, about 4 mm. wide; involucre 4–5 mm. high, its linear acuminate bracts narrowly scarious-margined; rays white, somewhat exceeding the disk-flowers.

Wet rocks and cliffs, Porto Rico:—Jamaica; Cuba.

Erigeron laevigatus Rich., a little known species of French Guiana, was listed by Krebs from St. Thomas, apparently in error.

18. **LEPTILON** Raf. Am. Month. Mag. 2: 268. 1818.

Annual or biennial herbs, with small racemose thyrsoïd or paniced heads of white flowers, the rays small, usually shorter than the diameter of the disk, or none. Involucre mostly campanulate, its narrow bracts in 2 or 3 series. Receptacle naked. Ray-flowers pistillate; rays short; disk-flowers perfect, their corollas usually 4-lobed or 4-toothed, the anthers obtuse at the base; style-branches somewhat flattened, their appendages short. Achenes flattened. Pappus of numerous simple fragile bristles in 1 series. [Greek, referring to the small heads.] About 20 species, of America and Asia. Type species: *Erigeron divaricatum* Michx.

Leaves linear, or the lower spatulate or oblanceolate, entire or few-toothed; involucre 2–3 mm. high.

Lower leaves lanceolate to obovate or oblong-lanceolate, coarsely toothed; involucre about 5 mm. high.

Lower leaves lanceolate to oblong-lanceolate.

Foliage green.

Foliage whitish-hirsute.

Lower leaves obovate to broadly spatulate.

1. *L. pusillum*.

2. *L. bonariense*.

3. *L. linifolium*.

4. *L. chinense*.

1. **Leptilon pusillum** (Nutt.) Britton, Torrey **14**: 198. 1914.

Erigeron pusillus Nutt. Gen. **2**: 148. 1818.

Stem glabrate, 7–30 cm. high, the larger plants paniculately much branched. Leaves usually ciliate, the basal and lower spatulate, petioled, dentate or entire, 2–10 cm. long, obtuse or acutish, those of the stem linear and mainly entire; heads usually very numerous, about 4 mm. broad; involucre 2–3 mm. high, its bracts linear, acute, glabrate, often purple-tipped; rays numerous, white, shorter than the pappus and mostly shorter than their tubes. [*Erigeron canadensis* of Bello, of Stahl, of Eggers of Krebs and of Urban, not of Linnaeus; *Leptilon canadense* of Millspaugh, not of Britton.]

In fields and waste places, Porto Rico; Mona; Vieques:—eastern United States; Bermuda; West Indies; South America. PASCUETA. OROZUZ. HORSEWEED.

2. **Leptilon bonariense** (L.) Small, Fl. SE. U. S. 1231, 1340. 1903.

Erigeron bonariense L. Sp. Pl. 863. 1753.

Pilose or glabrate; stem erect, rather stout, usually branched, leafy, 3–12 dm. high. Lower leaves lanceolate to oblanceolate, acute, sometimes 15 cm. long and 2 cm. wide, toothed or pinnately lobed, the upper much smaller, linear to lanceolate, mostly entire; inflorescence narrowly paniculate, the heads usually very numerous; involucre about 5 mm. high, its bracts linear, acuminate, loosely pubescent; pappus tawny.

Banks, fields and hillsides, Porto Rico, ascending into the Luquillo Mountains; Mona; Vieques; Tortola:—Florida; Jamaica; Cuba; Hispaniola; Saba to Trinidad; continental tropical America.

3. **Leptilon linifolium** (Willd.) Small, Fl. SE. U. S. 1231, 1340. 1903.

Erigeron linifolius Willd. Sp. Pl. **3**: 1955. 1804.

Conyza ambigua DC. Fl. Fr. **6**: 468. 1815.

Hirsute; stem slender, branched or simple, 7 dm. high or less. Leaves linear or linear-spatulate, 1.5–10 cm. long, the upper entire, sessile, the lower broader, incised-serrate and petioled; heads paniculate or subracemose, several or numerous; involucre about 5 mm. high, its bracts linear, acuminate, pilose; achenes glabrous; pappus tawny, about 3 times as long as the achene.

Waste grounds, St. Thomas:—southeastern United States; Bermuda; Bahamas; Cuba; Old World tropics and subtropics.

4. **Leptilon chinense** (Jacq.) Britton.

Erigeron chinensis Jacq. Hort. Schomb. **3**: 30. 1798.

Erigeron spathulatus Vahl in West, Bidr. St. Croix 303. 1793.

Pilose-pubescent; stem erect, rather stout, 2–10 dm. high, simple or considerably branched, leafy; no tuft of basal leaves. Lower leaves spatulate to obovate, usually coarsely dentate, 2–10 cm. long, narrowed into margined petioles which are sometimes nearly as long as the blade; upper leaves successively smaller, shorter petioled or sessile, the uppermost lanceolate to linear-oblong, entire; heads in loose terminal corymbs, slender-peduncled; involucre 4–5 mm. high.

Roadsides, fields and borders of woodlands, Porto Rico at lower and middle elevations; St. Croix; St. Thomas; St. Jan:—Hispaniola; St. Martin to Trinidad.

An incomplete specimen, collected by Heller in 1899 in moist soil, near Rio Piedras, Porto Rico, (No. 176) of a rather stout loosely pubescent plant about 5 dm. high, with many fibrous roots, narrow upper leaves 2–3 cm. long, the flower-heads about 5 mm. broad, the disk-flowers yellowish, perhaps represents another species of this relationship.

19. **BACCHARIS** L. Sp. Pl. 860. 1753.

Dioecious shrubs, with alternate leaves, and small, paniculate or corymbose heads of tubular flowers. Involucre campanulate or oblong, its many bracts

imbricated in several series, the outer shorter. Receptacle flat, naked, commonly foveolate. Corolla of the pistillate flowers slender, that of the staminate tubular, 5-lobed. Anthers obtuse and entire at the base. Style-branches narrow or subulate, those of the fertile flowers smooth, exserted, those of the sterile flowers rudimentary, tipped with an ovate pubescent appendage. Achenes more or less compressed, ribbed. Pappus of the fertile flowers copious, capillary, that of the sterile flowers short. [Named for Bacchus; originally applied to some different shrubs.] About 300 species, all American, most abundant in South America. Type species: *Baccharis ivaeifolia* L.

1. **Baccharis dioica** Vahl, Symb. 3: 98. 1794.

Baccharis Vahlia DC. Prodr. 5: 411. 1836.

Glabrous, branched, 2 m. high or less, somewhat glutinous, the twigs striate, densely leafy, sometimes granular. Leaves obovate or cuneate-obovate, 2–4 cm. long, 1–2 cm. wide, obtuse or subtruncate and mucronulate at the apex, narrowed at the base into short petioles; the midvein rather prominent, the lateral venation obscure; heads clustered at the ends of the twigs; involucre 4–7 mm. high, its bracts oblong, imbricated in 4 or 5 series; pappus of the pistillate heads about as long as the corollas; achenes 10-ribbed, glabrous.

Coastal limestone cliff between Puerto Diablo and Salina, Vieques; coastal rocks, St. Croix;—Florida; Bahamas; Jamaica; Cuba; Hispaniola; Montserrat. BROOM BUSH.

20. **PLUCHEA** Cass. Bull. Soc. Philom. 1817: 31. 1817.

Pubescent or glabrous herbs, or some tropical species shrubby, with alternate dentate leaves, and small heads of tubular flowers in terminal corymbose cymes. Involucre ovoid, campanulate, or nearly hemispheric, its bracts appressed, herbaceous, imbricated in several series. Receptacle flat, naked. Outer flowers of the head pistillate, their corollas filiform, 3-cleft or dentate at the apex. Central flowers perfect, but mainly sterile, their corollas 5-cleft. Anthers sagittate at the base, the auricles caudate. Style of the perfect flowers 2-cleft or undivided. Achenes 4–5-angled. Pappus a single series of capillary scabrous bristles. [Named for the Abbé N. A. Pluche, of Paris.] About 35 species, widely distributed in warm and temperate regions. The plants are called SALVIA and SOUR-BUSH. Type species: *Conyza marilandica* Michx.

Herbaceous; leaves ovate, nearly glabrous.
Shrub; leaves oblong, densely pubescent beneath.

1. *P. purpurascens*.
2. *P. odorata*.

1. **Pluchea purpurascens** (Sw.) DC. Prodr. 5: 452. 1836.

Conyza purpurascens Sw. Prodr. 112. 1788.

Herbaceous, annual; stems rather stout, finely pubescent at least above, simple or branched, 3–12 dm. high. Leaves ovate to ovate-lanceolate, sparingly finely pubescent or glabrate, dentate or crenate-dentate, acute or acuminate at the apex, narrowed or obtuse at the base, 5–12 cm. long, the petioles 3 cm. long or less, the upper ones smaller, nearly sessile; heads usually numerous; involucre 3.5–4 mm. its bracts ovate to lanceolate, acute, pubescent; flowers pink.

Marshes and wet meadows, Porto Rico, along the coasts, mostly within saline influence but ascending river valleys; Mona; Icacos; St. Croix; St. Thomas; Tortola; Anegada;—southeastern United States to southern Mexico and Central America; Bermuda; West Indies south to Guadeloupe.

2. *Pluchea odorata* (L.) Cass. Dict. Sci. Nat. **42**: 3. 1826.

Conyza odorata L. Syst. ed. 10, 1213. 1759.

A densely and finely pubescent shrub up to 3 m. high. Leaves oblong, entire or undulate-serrate with small blunt teeth, 8–20 cm. long, 1.5–5 cm. wide, rather dark green, loosely pubescent, becoming nearly glabrous above, finely and densely pubescent and pale beneath, acute or acuminate at the apex, narrowed at the base, the petioles 1–4 cm. long; corymbs mostly large; peduncles and involucre densely pubescent; involucre about 5 mm. high, its bracts ovate to lanceolate, acute to acuminate; flowers cream, pink or whitish.

Thickets and hillsides, Porto Rico at lower and middle elevations; Icacos; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Florida; West Indies; Mexico to northern South America. SWEET SCENT.

21. *PTEROCAULON* Ell. Bot. S. C. & Ga. **2**: 323. 1824.

Erect tomentose somewhat woody herbs, with alternate decurrent leaves, the small discoid heads glomerate, often forming an elongated inflorescence. Involucre ovoid or campanulate, its narrow bracts imbricated in few series, the inner ones mostly deciduous. Receptacle naked, sometimes pubescent. Marginal flowers perfect and fertile, with filiform corollas. Central flowers neutral, with tubular corollas. Anthers caudate-sagittate. Achenes angled. Pappus of capillary bristles. About 12 species, natives of America, Asia and Australasia. Type species: *Pterocaulon pycnostachyum* (Michx.) Ell. Known in Porto Rico as TIBEY and ESCOBILLON.

Stem-leaves linear to linear-lanceolate, mostly entire; inflorescence wand-like, elongated.

Stem-leaves oblong to oblong-lanceolate crenulate-serrulate; inflorescence very dense.

1. *P. virgatum*.

2. *P. alopecuroides*.

1. *Pterocaulon virgatum* (L.) DC. Prodr. **5**: 454. 1836.

Gnaphalium virgatum L. Syst. ed. 10, 1211. 1759.

Conyza virgata L. Sp. Pl. ed. 2, 1206. 1763.

Pluchea virgata Less.; Schl. Linnaea **6**: 726. 1831.

Stem erect, stiff, 1 m. high or less, rather slender, usually branched, narrowly winged by the decurrent leaf-bases. Basal leaves oblong, sometimes 5–8 cm. long, 2–3 cm. wide; stem-leaves linear to linear-lanceolate, 10 cm. long or less, 3–15 mm. wide, entire or nearly so, acuminate at the apex, narrowed at the base; heads in sessile glomerules in an interrupted narrow wand-like, simple or branched thyrsus; involucre about 5 mm. high, its inner bracts linear-lanceolate.

Rocky hillsides, Cabeza de San Juan, Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Cuba; Hispaniola (according to Plumier); Texas; Mexico; southern South America, ? Jamaica.

2. *Pterocaulon alopecuroides* (Lam.) DC. Prodr. **5**: 454. 1836.

Conyza alopecuroides Lam. Encycl. **2**: 93. 1786.

Stem erect, stout, 5–10 dm. high, broadly winged by the decurrent leaf-bases simple, or with few nearly erect branches. Basal leaves obovate, 6 cm. long or more; stem-leaves oblong to oblong-lanceolate, or the lower oblanceolate, 4–9 cm. long, 1–4 cm. wide, acute or obtuse, usually crenulate-serrulate; inflorescence a very dense compound thyrsus 4–20 cm. long, usually simple, sometimes with 1 or few short branches; inner involucre-bracts linear-lanceolate, acuminate, the outer shorter.

Hillsides at middle elevations, central and western districts of Porto Rico; St. Croix:—Jamaica; Cuba; Hispaniola; Antigua; Guadeloupe, Martinique; South America. Referred to the preceding species by Grisebach, by Bello and by Stahl. ESCOBILLON.

22. **GNAPHALIUM** L. Sp. Pl. 850. 1753.

Woolly branched herbs, with alternate leaves, and discoid heads of pistillate and perfect flowers in corymbs, spikes, racemes, or glomerules. Involucre scarious. Receptacle flat, convex or conic, usually foveolate. Pistillate flowers in several series, their corollas filiform, minutely dentate or 3-4-lobed. Central flowers perfect, tubular, few, their corollas 5-toothed or 5-lobed. Anthers sagittate at the base, the auricles tailed. Achenes oblong or obovate, terete or slightly compressed, not ribbed. Pappus a single series of capillary bristles, sometimes thickened above, cohering at the base, or separately deciduous. [Greek, referring to the wool.] About 120 species, widely distributed. Known as CUDWEED and BOTONCILLO. Type species: *Gnaphalium luteo-album* L.

Slender, low; leaves spatulate to narrowly obovate.

Bracts of the involucre yellowish; stem weak; annual.

Bracts of the involucre dark brown; stem erect; perennial.

Stout and tall; leaves linear to linear-lanceolate.

1. *G. indicum*.

2. *G. spicatum*.

3. *G. portoricense*.

1. **Gnaphalium indicum** L. Sp. Pl. 852. 1753.

Annual with fibrous roots; stems weak, erect or diffuse, usually branched, 3 dm. long or less, densely white-woolly. Leaves spatulate, narrowly obovate or linear-oblongate, 1-4 cm. long, 3-11 mm. wide, obtuse, rounded or apiculate at the apex, narrowed to a somewhat clasping base, green and loosely floccose or becoming glabrate above, densely white-woolly beneath; heads in dense or interrupted, simple or branched spikes; involucre about 2 mm. long, its bracts linear, acutish or obtuse, yellowish-brown. [*G. americanum* of Stahl, not of Miller; *G. purpureum* of Cook & Collins, not of Linnaeus.]

Moist banks and muddy places, Porto Rico, at lower and middle elevations;—Cuba; Hispaniola; South America; Old World tropics. YERBA LANUDA.

2. **Gnaphalium spicatum** Lam. Encycl. 2: 757. 1788.

Perennial by short rootstocks; stem erect, 1.5-6 dm. tall, usually simple, white-woolly. Leaves spatulate or linear-spatulate, 2-6 cm. long, 1 cm. wide or less, obtuse or mucronulate at the apex, more or less narrowed at the base, green and glabrate above, white-woolly beneath; heads thyrsoïd-spicate; involucre 3-4 mm. long, its dark brown, linear bracts acutish, glabrous.

Roadside bank between Adjuntas and Jayuya, 1915;—Jamaica; Cuba; Hispaniola; Central and South America.

3. **Gnaphalium portoricense** Urban, Symb. Ant. 3: 409. 1903.

Stem stout, erect, 6-20 dm. high, usually branched above, white-woolly to the base. Leaves linear to linear-lanceolate, 12 cm. long or less, 0.5-1.7 cm. wide, acuminate at the apex, somewhat dilated and partly clasping at the base, dull green, sparingly pubescent or becoming glabrate above, white-woolly beneath, those of branches much smaller than those of the stem; inflorescence corymbose, sometimes 2.5 dm. broad; involucre 5-6 m. high, its outer bracts ovate, woolly, the inner linear-lanceolate, obtuse or acute, nearly white, glabrous, shining.

Hillsides and banks at middle elevations, central and western districts of Porto Rico. Referred by Bello and by Stahl to *G. domingense* Lam. Endemic.

23. **NOCCA** Cav. Icon. 3: 12. 1795.

Herbs or shrubs, with opposite leaves, or the upper leaves alternate, and solitary or glomerate 1-flowered heads, the flowers perfect and fertile. Involucre nearly tubular, its bracts partly connate. Corolla with a short tube and a long

5-cleft limb. Anthers short-sagittate. Style-branches elongated. Achene compressed or 3-angled. Pappus annular or cupulate, dentate or fimbriate. [Commemorates Domenico Nocca, Professor in Padua.] About 20 species, natives of Mexico and tropical America. Type species: *Nocca rigida* Cav.

1. **Nocca mollis** (Cav.) Jacq. Fragm. 58. 1805.

Lagasca mollis Cav. Anal. Cient. Nat. 6: 332. 1803.

Annual, branched, 3–8 dm. high, grayish-pubescent all over, glandular above, the stem striate. Leaves thin and flaccid, ovate to lanceolate, 2–10 cm. long, serrate, or the upper nearly entire, acuminate at the apex, narrowed, obtuse or subtruncate at the base, the slender petioles often one-half as long as the blades; heads long-peduncled, solitary or few together; involucre about 8 mm. high, its bracts oblanceolate to oblong, acute or acutish; flowers whitish; achenes oblanceolate, about 3 mm. long, black; pappus very little.

Waste and cultivated grounds at lower elevations; Porto Rico; St. Thomas:—Jamaica; Cuba; Anguilla to Barbados; Curaçao; continental tropical America. Appears in Porto Rico as if a naturalized weed.

24. **CLIBADIUM** [Alem.] L. Mant. 2: 161, 294. 1771.

Herbs, shrubs or trees, with opposite leaves and small corymbose many-flowered heads of tubular flowers, the marginal ones fertile, those of the disk perfect but sterile. Involucre-bracts few. Receptacle small, mostly naked. Anthers entire or minutely 2-toothed at the base. Style of the fertile flowers entire. Achenes obovoid, subtended by the involucre-bracts. Pappus none. [Name Greek, used by Dioscorides for some plant.] Type species: *Clibadium surinamense* L.

1. **Clibadium erosum** (Sw.) DC. Prodr. 5: 506. 1836.

Trixis erosa Sw. Prodr. 115. 1788.

A shrub or tree up to 10 m. high, the twigs densely pubescent. Leaves rather thin, broadly ovate to ovate-oblong, 7.5–25 cm. long, acuminate at the apex, narrowed or obtuse at the base, roughish on both sides and sparingly pubescent, coarsely and finely incised-serrate, the larger teeth often 8 mm. long, triangular, acute; petioles stout, pubescent, sometimes nearly one-half as long as the blades; corymbs convex, 8–13 cm. broad, pubescent; heads subglobose, about 5 mm. high, nearly or quite sessile; involucre of 1–4 ovate acute bracts; receptacle somewhat scaly; flowers white to purple.

In mountain forests, eastern and central districts of Porto Rico:—Saba; St. Kitts; Montserrat; Guadeloupe; Dominica; Martinique. Recorded by Krebs from St. Thomas.

25. **MELAMPODIUM** L. Sp. Pl. 921. 1753.

Herbs, some species woody, with opposite entire or dentate leaves, and terminal peduncled heads of both tubular and radiate, white or yellow flowers. Involucre hemispheric, its bracts in 2 series, the 4 or 5 outer ones broad, often connate at the base, the inner hooded, embracing or permanently surrounding the pistillate fertile ray-flowers. Receptacle convex or conic, chaffy. Ray-flowers in 1 series, the rays spreading, 2–3-lobed or entire. Disk flowers perfect, sterile, their corollas with a narrowly campanulate 5-toothed limb, the anthers entire at the base, the style undivided. Achenes obovoid, more or less incurved. Pappus none. [Greek, black-foot, the leaf-bases of the typical species are black-

ish.] About 35 species, natives of the warmer parts of America. Type species: *Melampodium americanum* L.

1. **Melampodium divaricatum** (L. C. Rich.) DC. Prodr. 5: 520. 1836.

Dysodium divaricatum L. C. Rich. in Pers. Syn. 2: 489. 1807.

Melampodium paludosum H.B.K. Nov. Gen. 4: 273. 1820.

Annual, with fibrous roots; stem rather slender, dichotomously branched, erect, 3–7 dm. high, loosely pubescent. Leaves ovate to ovate-lanceolate, 3–12 cm. long, 7 cm. wide or less, thin in texture, undulate-dentate, 3-nerved from above the base and pinnately veined, acute or acuminate at the apex, mostly cuneate at the base, roughish above, sparingly pubescent beneath, the petioles sometimes 3 cm. long; heads few, on long slender pubescent peduncles; involucre depressed-hemispheric, about 3 mm. high and 7 mm. broad, its 5 outer bracts obovate, obtuse, ciliate; rays 5–7 mm. long, yellow, 3-toothed. [*Scolospermum* of Bello.]

Banks and grassy places at lower and middle elevations, districts of Mayaguez and Maricao, Porto Rico; St. Croix. Native of continental tropical America. BOTON DE ORO.

26. **ACANTHOSPERMUM** Schrank, Pl. Rar. Hort. Monac. pl. 53. 1819.

Annual rather coarse herbs, with pubescent foliage and erect or creeping stems, opposite broad, often leathery, toothed leaves, and radiate but inconspicuous heads, axillary to leaf-like bracts. Involucre double, an outer one of flat herbaceous bracts, and an inner one of several smaller bracts which become bur-like and fall away enclosing an achene at maturity. Receptacle concave or convex. Ray-flowers few, in 1 series, the rays very small, yellowish, concave or hooded. Disk-flowers perfect, sterile. Anthers entire at the base. Achenes broadest above the middle, slightly curved. Pappus wanting. [Greek, thorn-seed, from the prickly bur-like fruits.] About 8 species, natives of tropical America. Type species: *Acanthospermum brasiliun* Schrank.

1. **Acanthospermum hispidum** DC. Prodr. 5: 522. 1836.

Acanthospermum humile hispidum Kuntze, Rev. Gen. Pl. 303. 1891.

Hispid-pubescent, branched, erect, 2–6 dm. high. Leaves elliptic to ovate, 2–12 cm. long, dentate, obtuse or acute at the apex, narrowed to a sessile base; heads short-peduncled; fruit cuneate, densely uncinat, 4–5 mm. long, with 2 terminal divergent prickles 3–4 mm. long. [*A. humile* of Eggers, not of de Candolle.]

Waste grounds, Culebrita; St. Croix; St. Thomas; Tortola; Virgin Gorda;—southeastern United States; St. Martin; Montserrat; Guadeloupe; Tobago; continental tropical America. Has been confused with *A. humile* (Sw.) DC.

27. **PARTHENIUM** L. Sp. Pl. 988. 1753.

Erect, mostly pubescent or canescent herbs, or shrubs, with alternate leaves, and small, corymbose or paniculate heads of both tubular and radiate, white or yellow flowers. Involucre broadly campanulate or hemispheric, its bracts imbricated in 2 or 3 series, obtuse, appressed, nearly equal. Receptacle convex or conic, chaffy, the chaff membranous, surrounding the disk-flowers. Ray-flowers about 5, pistillate, fertile, their ligules short, broad, 2-toothed or obcordate. Disk-flowers perfect, sterile, their corollas 5-toothed, the style undivided. Anthers entire at the base. Achenes compressed, keeled on the inner face,

margined, bearing the persistent rays on the summit. Pappus of 2-3 scales or awns. [Greek, virgin.] About 10 American species. Type species: *Parthenium Hysterophorus* L.

1. **Parthenium Hysterophorus** L. Sp. Pl. 988. 1753.

Annual, strigose-pubescent or somewhat villous, usually much branched, 3-7 dm. high. Leaves ovate to oblong in outline, 1-2-pinnately parted into linear or lanceolate, toothed or pinnatifid segments, thin and flaccid: heads numerous, 5-6 mm. broad: involucre saucer-shaped, its bracts concave, the outer ones rhombic, the inner broader; ray-flowers few; rays reniform, white, about 1 mm. wide; achenes obovate, about 1 mm. long.

Waste and cultivated grounds, an abundant weed, Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan:—southern United States; Bermuda; West Indies; continental tropical America. ARTEMISIA. YERBA AMARGA. AJENJO CIMARRON. SANTA MARIA FEVER-FEW. MUGWORT.

28. **CRASSINA** Scepín, Acido Veg. 42. 1758.

Annual or perennial herbs, some species shrubby, with opposite entire, or sparingly serrate, mostly narrow and sessile leaves, and large or middle-sized heads of both tubular and radiate flowers. Ray-flowers pistillate, persistent on the achene. Disk flowers perfect; corolla cylindraceous, its lobes villous. Involucre campanulate to nearly cylindric, its bracts obtuse, dry, firm, appressed, imbricated in 3 series or more, the outer gradually shorter. Receptacle conic or cylindric, chaffy, the chaff subtending and enwrapping the disk-flowers. Style-branches elongated, not appendaged. Achenes of the ray-flowers somewhat 3-angled, those of the disk flattened. Pappus of few awns or teeth. [In honor of Paul Crassus, an Italian botanist of the 16th century.] About 15 species, natives of the United States and Mexico. Type species: *Chrysogonum peruvianum* L.

Achenes of disk-flowers obovate.
Achenes of disk-flowers oblong.

1. *C. elegans*.
2. *C. multiflora*.

1. **Crassina elegans** (Jacq.) Kuntze, Rev. Gen. Pl. 331. 1891.

Zinnia elegans Jacq. Coll. 5: 152. 1789.

Stem more or less hirsute, erect, branched or simple, 3-7 dm. tall. Leaves ovate to ovate-lanceolate or elliptic, sessile and somewhat clasping by a broad base, acute or acuminate at the apex, 3-8 cm. long, somewhat pubescent; peduncles rather stout, not thickened above; involucre about 1 cm. high, its broad rounded bracts black bordered and ciliate above; disk-flowers orange to yellow; rays purple to violet, usually numerous, 1.5-2.5 cm. long; disk-achenes obovate, about 5 mm. long; scales of the receptacle acuminate, toothed.

Spontaneous after cultivation in Porto Rico; common in Porto Rico and Virgin Island gardens. Widely spontaneous after cultivation in the West Indies. Native of Mexico. CLAVEL. GARDEN ZINNIA.

2. **Crassina multiflora** (L.) Kuntze, Rev. Gen. Pl. 331. 1891.

Zinnia multiflora L. Sp. Pl. ed. 2, 1269. 1763.

Stem somewhat pubescent, usually few-branched, erect, 6 dm. high or less. Leaves lanceolate or ovate-lanceolate, sessile or very nearly so, acuminate at the apex, rounded at the base, 4-8 cm. long, sparingly pubescent with short stiff hairs; peduncles usually much thickened upward, striate; involucre 1-1.5 cm. high, its bracts broadly oblong, rounded, sometimes black-banded above, not

ciliate but sometimes finely erose; rays red to purple, obovate, obtuse or emarginate, 1–1.5 cm. long; disk-achenes oblong, 6–8 mm. long; scales of the receptacle obtuse, entire.

Waste grounds and hillsides, Porto Rico, at lower elevations in dry regions; St. Thomas; St. Jan.—southern United States; Bahamas; Jamaica; Cuba; Hispaniola; Guadeloupe. Native of Mexico, Central and South America. CLAVELLELO. WILD ZINNIA.

29. **ENYDRA** Lour. Fl. Coch. 510. 1790.

Low herbs of wet grounds, with opposite sessile toothed leaves, and sessile or short-peduncled heads in alternate axils. Heads discoid and radiate, the ray-flowers pistillate. Involucre-bracts 4, foliaceous, opposite in pairs, the outer pair the larger. Receptacle convex or conic, its striate scales embracing the flowers. Rays small, toothed. Disk-flowers tubular with a campanulate limb. Achenes oblong, compressed. Pappus none. [Greek, inhabiting water.] About 8 species, natives of tropical regions of the Old World and the New. Type species: *Enydra fluctuans* Lour.

1. **Enydra sessilis** (Sw.) DC. Prodr. 5: 637. 1836.

Eclipta sessilis Sw. Prodr. 114. 1788.

Somewhat fleshy, glabrate, or pubescent, often rooting at the lower nodes; stems few-branched, ascending, 5 dm. long or less. Leaves oblong or oblong-obovate, 1.5–6 dm. long, acute or obtuse at the apex, narrowed at the base, pinnately veined, rather coarsely few-toothed; heads solitary in the axils; involucre about 6 mm. high, its 2 outer bracts broadly ovate, obtuse, the 2 inner narrower; achenes enclosed by the scales of the receptacle; rays very small.

Wet grounds at lower and middle elevations, central and western districts of Porto Rico;—Jamaica; Cuba; Hispaniola; South America.

30. **VERBESINA** L. Sp. Pl. 901. 1753.

Erect or diffuse, branching, pubescent or hirsute herbs, with opposite leaves, and small peduncled terminal and axillary heads of tubular and radiate whitish flowers. Involucre hemispheric or broadly campanulate, its bracts imbricated in about 2 series, nearly equal, or the outer longer. Receptacle flat or convex, chaffy, the chaff awn-like, subtending the achenes. Ray-flowers pistillate, fertile. Disk-flowers perfect, mostly fertile, their corollas tubular, 4-toothed or rarely 5-toothed. Achenes thick, those of the rays 3-sided, those of the disk compressed. Pappus none, or of a few short teeth. [Name changed from *Verbena*.] About 4 species, the following typical.

1. **Verbesina alba** L. Sp. Pl. 902. 1753.

Eclipta erecta L. Mant. 2: 286. 1771.

Eclipta punctata L. loc. cit. 1771.

Eclipta alba Hassk. Pl. Jav. Rar. 528. 1848.

Annual, appressed-pubescent, erect or diffuse, 1.5–9 dm. high. Leaves lanceolate, oblong-lanceolate or linear-lanceolate, acute or acuminate, denticulate or entire, narrowed to a sessile base, or the lower petioled, 2–12 cm. long, 4–20 mm. wide; heads commonly numerous, 6–12 mm. broad, nearly sessile, or slender-peduncled; rays short, nearly white; anthers brown.

Wet or moist grounds at lower and middle elevations, Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan; Tortola;—continental temperate and tropical America; Bermuda; West Indies; Old World tropics and subtropics.

31. **SCLEROCARPUS** Jacq.; Murr. Syst. 783. 1784.

Branching pubescent herbs, with alternate leaves, or the lower ones opposite, the rather large heads of tubular and radiate flowers terminal, or opposite the leaves. Involucre campanulate, the few bracts in about 2 series. Receptacle convex or conic, chaffy, the chaff closely investing the achenes of the disk-flowers. Ray-flowers ligulate, neutral, the rays entire or scarcely dentate. Disk-flowers perfect, with tubular corollas, the limb 3-5-cleft. Achenes smooth, falling away with the attached coriaceous receptacle-chaff. Pappus none, or a short crown. [Greek, hard fruit.] About a dozen species, natives of tropical America and Africa, the following typical.

1. **Sclerocarpus africanus** Jacq.; Murr. Syst. 783. 1784.

Annual, widely branching, villous, 2-3 dm. high. Leaves thin, ovate, serrate, 2-3 cm. long, acute, short-petioled; heads solitary, sessile at the ends of the branches; involucre about 6 mm. high, its outer bracts foliaceous, oblong, pilose; rays yellow; achenes, with the enclosing chaff, about 6 mm. long.

Sandy sea-beach, St. Thomas, February, 1913. Native of tropical Africa.

32. **BORRICHIA** Adans. Fam. Pl. 2: 130. 1763.

Fleshy, more or less canescent, branching shrubs of the sea-coast, with opposite entire or denticulate, cuneate, oblong, spatulate or obovate, 1-3-nerved leaves, and terminal large peduncled heads of both tubular and radiate yellow flowers. Involucre hemispheric, its bracts slightly unequal, imbricated in 2 or 3 series, the inner ones coriaceous. Receptacle convex, chaffy, the chaff rigid, concave, subtending or enwrapping the disk flowers. Ray-flowers fertile. Disk-flowers perfect, the corolla tubular, 5-toothed, the style-branches elongated, hispid. Anthers dark colored, entire at the base, or minutely sagittate. Achenes of the ray-flowers 3-sided, those of the disk-flowers 4-sided. Pappus a short dentate crown. [Named for Olaf Borrick, a Danish botanist.] About 5 species, natives of America. Type species: *Bupthalmum frutescens* L.

1. **Borrichia arborescens** (L.) DC. Prodr. 5: 489. 1836.

Bupthalmum arborescens L. Syst. ed. 10, 1227. 1759.

Borrichia argentea DC. Prodr. 5: 489. 1836.

Borrichia glabrata Small, Fl. SE. U. S. 1263, 1340. 1903.

A branching shrub, 1.3 m. high or less, densely white silky-canescens, or green and glabrous. Leaves fleshy, oblanceolate to spatulate, entire, 6 cm. long or less, 6-15 mm. wide, acute or obtuse and cuspidate at the apex, narrowed to the base, sessile, obscurely veined; heads mostly solitary, rarely 2 together; peduncle 2-5 cm. long; involucre 1-1.5 cm. high, its bracts obtuse or acute, appressed; rays few, 6-9 mm. long. [*Borrichia frutescens* of Millspaugh and of Krebs, not of de Candolle.]

Coastal rocks, Porto Rico; Icacos; Mona; Vieques; Culebra; St. Croix; St. Thomas; Anegada;—Florida; Bermuda; West Indies; continental tropical America. CLAVELON DE PLAYA. SEA OX-EYE.

33. **WEDELIA** Jacq. Enum. 8, 28. 1760.

Herbs or shrubs, with opposite, toothed or entire leaves, and peduncled heads of both radiate and discoid yellow flowers. Involucre ovoid to hemispheric.

its bracts in about 2 series, the outer somewhat foliaceous. Receptacle flat or convex, its scales enveloping the disk-flowers. Ray-flowers pistillate. Disk-flowers perfect, their corollas tubular with a cylindric to campanulate limb. Achenes oblong to obovate, smooth, pilose or tubercled, truncate or conic at the top; pappus cup-like, toothed or divided, or obsolete. [Commemorates George Wolfgang Wedel, 1645–1721, Professor at Jena.] About 50 species of warm-temperate and tropical regions, the Porto Rico ones known as MANZANILLA. Type species: *Wedelia fruticosa* Jacq.

Decumbent herbs; achenes conic at apex, tubercled.

Plant glabrous or sparingly pubescent; fleshy; involucre 8–12 mm. high.

Plant hirsute, not fleshy; involucre 6–8 mm. high.

Erect or vine-like shrubs; achenes truncate, pilose.

Leaves prominently reticulate-veined beneath.

Leaves not prominently reticulate-veined.

Leaves ovate to lanceolate.

Heads small, the involucre-bracts 6–8 mm. long; leaves mostly 2–7 cm. long.

Heads larger, the involucre-bracts 8–15 mm. long; leaves mostly 7–15 cm. long.

Leaves narrowly lanceolate.

1. *W. trilobata*.

2. *W. gracilis*.

3. *W. reticulata*.

4. *W. parviflora*.

5. *W. calycina*.

6. *W. lanceolata*.

1. ***Wedelia trilobata* (L.) Hitchc.** Rep. Mo. Bot. Gard. 4: 99. 1893.

Silphium trilobatum L. Syst. ed. 10, 1233. 1759.

Wedelia carnosa L. C. Rich. in Pers. Syn. 2: 490. 1807.

Wedelia triloba Bello, Anales Soc. Esp. Hist. Nat. 10: 285. 1881.

Stemmodontia carnosa Cook & Collins, Contr. U. S. Nat. Mus. 8: 244. 1903.

Stemmodontia trilobata Small, Fl. SE. U. S. 1262, 1340. 1903.

Herbaceous, prostrate or with ascending branches glabrate or sparingly strigose-pubescent, often rooting at the nodes, 3–10 dm. long. Leaves somewhat fleshy, elliptic to obovate, 2–12 cm. long, obtuse or acute at the apex, dentate, often several-lobed, narrowed or cuneate at the base, triplinerved and pinnately veined, sessile or nearly so; peduncles solitary in the upper axils, 2–14 cm. long; involucre 8–12 mm. long, its 5 bracts oblong-obovate, foliaceous; rays about 10, bright yellow, 10–15 mm. long; achenes about 5 mm. long, tuberculate.

Banks and fields, at lower and middle elevations in moist districts, Porto Rico; St. Thomas; St. Croix; Tortola:—Florida; West Indies; Honduras to Colombia.

2. ***Wedelia gracilis* L. C. Rich.** in Pers. Syn. 2: 490. 1807.

Slender, prostrate or nearly so, about 4 dm. long or shorter, hirsute with long hairs, especially at the nodes, not fleshy. Leaves ovate to obovate or sub-orbicular, 1.5–6 cm. long, 3–5-lobed and often dentate, acute or obtuse, short-petioled or sessile, loosely hirsute on both sides, triplinerved; peduncles terminal or also in the upper axils, solitary, slender, elongated, up to 2 dm. long; involucre 6–8 mm. long, its bracts oblong, obtuse, hirsute; rays 10–15, yellow, 8–12 mm. long; achenes about 3.5 mm. long, tuberculate.

Recorded as collected by Schwanecke in eastern Porto Rico, prior to 1849; a barren specimen collected by J. R. Johnston at Rio Piedras in 1912, (no. 334) appears to be this species:—Jamaica; Cuba; Hispaniola.

3. ***Wedelia reticulata* DC.** Prodr. 5: 540. 1836.

Seruneum reticulatum Kuntze, Rev. Gen. Pl. 365. 1891.

Stemmodontia reticulata Cook & Collins, Contr. U. S. Nat. Mus. 8: 244. 1903.

Shrubby; stem slender, erect or vine-like, about 1 m. long or shorter, hirsute above, glabrous below, somewhat sulcate, at least when dry. Leaves oblong to oblong-lanceolate, 3–10 cm. long, crenulate or serrulate, strongly reticulate-

veined beneath, acute or acuminate, the base rounded or subcordate, the hirsute petioles 10 mm. long or shorter; peduncles terminal, solitary or 2 or 3 together, hirsute, mostly shorter than the leaves; involucre-bracts oblong, obtuse, 4–7 mm. long; rays about 12, yellow, 10–14 mm. long; achenes obconic, 4-sided, puncticulate, 3 mm. long.

Hillsides and thickets, Porto Rico, at lower and middle elevations in moist and dry districts:—Hispaniola.

4. **Wedelia parviflora** L. C. Rich. in Pers. Syn. 2: 490. 1807.

Polymnia parviflora Poir. in Lam. Encycl. Suppl. 4: 482. 1816.

Wedelia affinis DC. Prodr. 5: 541. 1836.

Seruneum affine Kuntze, Rev. Gen. Pl. 365. 1891.

Wedelia Jacquini parviflora O. E. Schulz in Urban, Symb. Ant. 7: 103. 1911.

A branched shrub, 1–2 m. high, or lower, the slender twigs short-hirsute, scabrous. Leaves ovate to lanceolate, serrulate or entire, short-petioled, 2–7 cm. long, scabrous, acute, acuminate or obtuse, the base obtuse or narrowed; peduncles terminal, solitary or 2 or 3 together, often longer than the leaves; involucre-bracts mostly 6–8 mm. long, ovate or oblong; rays bright yellow, 10–15 mm. long; achenes 3-sided, hirsute, 3–3.5 mm. long [*Wedelia bupthalmoides* of Eggers and of Millspaugh, not of Grisebach; *W. acapulcensis* of Schlechtendal, not of H.B.K.; *W. brachycarpa* of Millspaugh; *W. lanceolata* of Millspaugh; *Seruneum frutescens* of Kuntze.]

Coastal thickets and hillsides, eastern and southeastern Porto Rico: St. Thomas; St. Jan; Tortola; Virgin Gorda; Anegada:—St. Martin; Antigua; Guadeloupe; Martinique. The species was originally described from a specimen from Guadeloupe.

5. **Wedelia calycina** L. C. Rich. in Pers. Syn. 2: 490. 1807.

Wedelia cruciana L. C. Rich. loc. cit. 1807.

Polymnia calycina Poir. in Lam. Encycl. Suppl. 4: 482. 1816.

Polymnia cruciana Poir. loc. cit. 1816.

Wedelia caribaea Spreng. Syst. 3: 580. 1826.

Anomostephium bupthalmoides DC. Prodr. 5: 560. 1836.

Wedelia bupthalmoides Griseb. Fl. Br. W. I. 372. 1861.

Seruneum bupthalmoides Kuntze, Rev. Gen. Pl. 365. 1891.

Seruneum crucianum Kuntze, loc. cit. 1891.

Stemmodontia bupthalmoides Cook & Collins, Contr. U. S. Nat. Mus. 8: 244. 1903.

Wedelia Jacquini calycina O. E. Schulz, in Urban, Symb. Ant. 7: 102. 1911.

Wedelia Jacquini cruciana O. E. Schulz, loc. cit. 103. 1911.

Similar to *Wedelia parviflora*, commonly larger, often much branched, sometimes 3 m. high; the twigs scabrous-hirsute. Leaves ovate to ovate-lanceolate, 7–15 cm. long, low-serrate, acute or acuminate, scabrous; peduncles usually solitary, about as long as the leaves, or shorter; involucre-bracts 8–15 mm. long; rays bright yellow, up to 2 cm. long. [*Bupthalmum helianthoides* of West, not Linnaeus; *Wedelia Jacquini* of O. E. Schulz, not of L. C. Richard.]

Coastal hillsides and thickets, eastern and southeastern Porto Rico; Vieques; Icacos St. Croix; recorded from St. Thomas and St. Jan:—St. Martin to Barbados. Perhaps not distinct from the preceding species.

6. **Wedelia lanceolata** DC. Prodr. 5: 541. 1836.

Seruneum lanceolatum Kuntze, Rev. Gen. Pl. 365. 1891.

A much branched shrub, 1–2 m. high, the slender branches hirsute-scabrous. Leaves narrowly lanceolate to linear-lanceolate, scabrous, 2–9 cm. long, obscurely triplinerved, serrulate or entire, acuminate, the base narrowed or obtuse, the petioles 1–5 mm. long; peduncles terminal, solitary, 1–5 cm. long; involucre-bracts lanceolate to oblong, acuminate, acute or obtuse, 7–15 mm. long; rays

about 10, or fewer, 8–10 mm. long. [*Stemmodontia lanceolata* of Cook and Collins.]

River banks and bases of limestone hills, southwestern dry districts of Porto Rico; Mona. Endemic.

Wedelia fruticosa Jacq. [*Wedelia Jacquinii* L. C. Rich.] of the Lesser Antilles and northern South America, grown for ornament in Virgin Island gardens, is diffusely spreading or prostrate, the involucre-bracts broadly ovate.

34. **TITHONIA** Desf.; Gmel. Syst. 1259. 1791.

Tall herbs, sometimes woody toward the base, with large alternate petioled leaves, and large terminal peduncled heads of both radiate and tubular yellow or orange flowers. Involucre hemispheric or broadly campanulate, its somewhat unequal foliaceous appressed bracts in 2 series. Receptacle convex, scaly, its scales acuminate, embracing the disk-flowers. Ray-flowers neutral, the rays large and showy. Disk-flowers perfect and fertile, their corollas with a cylindraceous limb. Achenes oblong, compressed or 4-sided. Pappus various. [Named for Tithon, consort of Aurora.] Six species or more, natives of Mexico and Central America. Type species: *Tithonia uniflora* L.

Involucre-bracts acute; rays 2–2.5 mm. long; leaves mostly crenate or some 3-lobed.

Involucre bracts obtuse or the outer acute; rays 3–6 cm. long; nearly all leaves 3-lobed.

1. *T. rotundifolia*.

2. *T. diversifolia*.

1. **Tithonia rotundifolia** (Mill.) Blake, Contr. Gray Herb. 52: 41. 1917.

Tagetes rotundifolia Mill. Gard. Dict. ed. 8, no. 4. 1768.

Tithonia uniflora Gmel. Syst. 1259. 1791.

Tithonia tagetiflora Desf. Ann. Mus. Paris 1: 49. 1802.

Tithonia speciosa Hook.; Griseb. Cat. Pl. Cub. 155. 1866.

Stem stout, often 2 m. high, branched, finely soft-pubescent or becoming glabrate, straw-colored. Leaves broadly ovate, crenate, or the lower 3-lobed, sometimes 1.5 dm. long or more, 3-nerved, scabrous on both sides and short-pubescent, at least on the veins, acuminate at the apex, the base abruptly or gradually decurrent on the slender petiole; peduncles stout, 1–2 dm. long, thickened below the heads; involucre about 1.5 cm. high, its bracts pubescent, strongly striate, their foliaceous tips acute; rays orange-yellow, 3-toothed, about 2 cm. long; scales of the receptacle acute, much longer than the 4-sided appressed pubescent achenes; pappus of 1 or 2 long bristles and several triangular-lanceolate acute scales.

Roadsides, banks and pastures at lower elevations, Porto Rico, escaped from gardens where it is commonly cultivated, both in Porto Rico and the Virgin Islands; widely cultivated and subsontaneous in the West Indies. Native of Mexico and Central America. CLAVEL DE MUERTO. ESCOPETA.

2. **Tithonia diversifolia** (Hemsl.) A. Gray, Proc. Amer. Acad. 19: 5. 1883.

Mirasolia diversifolia Hemsl. Biol. Centr. Amer. Bot. 2: 168. 1881.

Stems somewhat woody, branched, sometimes vine-like, 2–6 m. long or perhaps longer, tomentose-pilose when young, becoming glabrous. Leaves mostly 3-lobed or 5-lobed, 7–20 cm. long, hispidulous above, canescent beneath, the cuneate base decurrent on the petiole, the lobes acuminate; peduncles 5–25 cm. long; involucre about 2 cm. high, its puberulent bracts oval to ovate, rounded, tipped, or the outer acutish; rays yellow, 3-toothed, 3–6 cm. long; scales of the

receptacle about 10 mm. long; achenes pilose, about 5 mm. long; pappus of 2 unequal awns and 6–10 small scales.

Roadside, Comerio, Porto Rico, February, 1925;—Jamaica. Native of Mexico and Central America. Introduced into the East Indies and recorded as becoming a pest in Burma. Occasionally planted for ornament in Porto Rico, as also in Barbados, Trinidad and Jamaica.

35. **ELEUTHERANTHERA** Poit.; Bosc. Nouv. Dict. Hist. Nat. 7: 498. 1803.

A low hirsute-pubescent annual herb, with thin opposite petioled toothed leaves, and small terminal and axillary heads of tubular perfect flowers, rarely with a few neutral flowers with very small rays, or with a few of the disk-flowers sterile. Involucre broadly campanulate, its bracts few, unequal. Receptacle convex, its scarious scales embracing the flowers. Corollas with campanulate limbs. Achenes thick, oblong-obovate, somewhat compressed, rounded at the top. Pappus cup-like, ciliate-dentate, or with 2 or 3 short awns. [Greek, the flower of liberty.] A monotypic genus of tropical America.

1. **Eleutheranthera ruderalis** (Sw.) Sch. Bip. Bot. Zeit. 24: 165. 1866.

Melampodium ruderale Sw. Fl. Ind. Occ. 1372. 1806.

Ogiera triplinervis Cass. Bull. Sci. 1818: 32. 1818.

Wedelia discoidea Less. Linnaea 6: 728. 1831.

O. triplinervis portoricensis DC. Prodr. 5: 546. 1836.

Ogiera portoricensis DC. Prodr. 5: 497. 1836.

Ogiera ruderalis Griseb. Mem. Am. Acad. II. 8: 513. 1862.

Spilanthes muticus Sessé & Moç. Fl. Mex. ed. 2, 179. 1894.

Eleutheranthera ovata Cook & Collins; Contr. U. S. Nat. Herb. 8: 138. 1903.

Roots fibrous; stem branched, 6 dm. high or less, the branches slender, sometimes diffusely spreading. Leaves ovate to oblong-lanceolate, 6 cm. long or less, 1–2.5 cm. wide, 3-nerved, loosely hirsute, dentate with small teeth, acute at the apex, rounded or narrowed at the base, the petioles 3–10 mm. long; peduncles 2–12 mm. long, slender, nodding; involucre 5–6 mm. long, its bracts oblong or ovate-oblong, obtuse; achenes 2–3 mm. long, smooth.

Coastal banks and waste and cultivated grounds, Porto Rico, at lower and middle elevations; Mona; St. Croix; St. Thomas; St. Jan:—West Indies (except Bahamas); central and South America. **OGERIA.**

36. **MELANTHERA** Rohr, Skrift. Nat. Selsk. 2: 213. 1792.

Perennial herbs, often quite woody, with opposite petioled dentate, sometimes hastate leaves, and peduncled heads of small white yellowish or violet tubular flowers. Involucre low-hemispheric, its few ovate to lanceolate, nearly equal bracts imbricated in 2 or 3 series. Receptacle convex or low-conic, scaly. Corollas subcylindric, with an expanded throat, 5-toothed. Anthers sometimes black, truncate or subsagittate at the base. Style-branches long. Achenes 4-angled; pappus of distinct caducous awns. [Greek, black anther.] About 10 species, of tropical and subtropical America, those of Porto Rico and the Virgin Islands closely interrelated. Type species: *Bidens nivea* L.

Involucre-bracts mostly ovate.

Leaves green and sparingly pubescent.

Leaves broadly ovate.

Leaves oblong-lanceolate.

Leaves canescent or densely pubescent beneath.

Leaves narrowed, obtuse or subtruncate at the base; green above.

Leaves cordate, canescent on both sides.

Involucre-bracts oblong-ovate or oblong-lanceolate.

1. *M. nivea*.

2. *M. calcicola*.

3. *M. canescens*.

4. *M. montana*.

5. *M. confusa*.

1. **Melanthera nivea** (L.) Small, Fl. SE. U. S. 1251. 1903.*Bidens nivea* L. Sp. Pl. 833. 1753.*Spilanthes litoralis* Sessé & Moc. Fl. Mex. ed. 2, 179. 1894.

Stems glabrate, erect, ascending or decumbent, sometimes vine-like, up to 3 m. long, the slender branches bluntly 4-angled, sparingly appressed-pubescent. Leaves ovate to ovate-orbicular, slender-petioled, 5–9 cm. long, crenate-serrate, green on both sides, sparingly pubescent beneath, scabrate above, acute or short-acuminate, the base narrowed, subtruncate or subcordate; heads solitary or 2 or 3 together, about 1 cm. in diameter in fruit; bracts of the involucre ovate, about 5 mm. long, strigose; pappus-bristles 0.5–3 mm. long.

Coastal sands and thickets, northern and eastern Porto Rico; Muertos; Vieques; Culebra;—St. Barts to Tobago.

2. **Melanthera calcicola** Britton, spec. nov.

Erect or nearly so, about 1 m. high, the slender branches sparingly appressed-pubescent. Leaves oblong-lanceolate, green on both sides, thin, 5–8 cm. long, rather coarsely irregularly crenate, sparingly pubescent beneath, scabrate-puberulent above, the apex acute, the base narrowed or subtruncate, the petioles 1–2 cm. long; heads long-peduncled, solitary or 2 together, in fruit about 1 cm. in diameter; involucre-bracts broadly ovate, obtuse, densely strigose-canescens, 4–5 mm. long.

Thicket, limestone hill east of Vega Alta, Porto Rico (Britton and Brown, 6784). Endemic.

3. **Melanthera canescens** (Kuntze) O. E. Schulz in Urban, Symb. Ant. 7: 116. 1911.*Amellus asper canescens* and forma *bicolor* Kuntze, Rev. Gen. Pl. 306. 1891.

Erect or nearly so, 0.5–2 m. high, the slender 4-sided branches appressed-pubescent. Leaves various, ovate to nearly lanceolate, 5–10 cm. long, crenate or crenulate, the slender petioles 1–4 cm. long, the under surface densely canescent-pubescent and often strongly reticulate-veined, the upper side loosely pubescent, green, scabrate, the apex acute or acuminate, the base subtruncate, subcordate or hastate; heads long-peduncled, solitary, 2 or 3 together, in fruit about 1 cm. in diameter; involucre-bracts ovate, densely strigose, acute or obtusish, about 4 mm. long; pappus-bristles 0.5–2 mm. long. [*M. Linnaei* of Schlechtendal, not of H.B.K.; *M. aspera* of Urban, not of L. C. Richard; *M. deltoidea* of Stahl, not of L. C. Richard.]

Banks, hillsides and thickets at lower and middle elevations, Porto Rico; St. Thomas. Endemic. CARIAQUITO BLANCO. YERBA DE CABRA.

4. **Melanthera montana** O. E. Schulz in Urban, Symb. Ant. 7: 121. 1911.

Branches obtusely 4-angled, appressed-pubescent, the twigs erect-spreading. Leaves triangular-ovate, scabrous and canescent above, tomentose-canescens beneath, 3–6 cm. long, sometimes hastately 3-lobed, closely crenate-serrate, long-acuminate, the base cordate, the petioles about 2 cm. long or shorter; peduncles 2–9 cm. long; heads about 1 cm. in diameter; outer involucre-bracts oblong, the inner ovate, acute, about 4 mm. long, densely strigose; pappus-bristles 2 mm. long; achenes about 2 mm. long.

Mountain woods near Bayamon, Porto Rico (*Sintenis* 1145, in part). Known to us only from description. Endemic.

5. **Melanthera confusa** Britton, spec. nov.*Melanthera hastata cubensis* O. E. Schulz in Urban, Symb. Ant. 7: 125. 1911.

Erect, about 1 m. high or less, the slender 4-sided branches sparingly appressed-pubescent. Leaves ovate to deltoid-ovate, petioled, 5–10 cm. long,

dentate or crenate-dentate, sometimes hastately 3-lobed, scabrous above, short-pubescent beneath, the apex acute or acuminate, the base narrowed, obtuse or subtruncate; heads long-peduncled, solitary or 2 or 3 together, 10–12 mm. in diameter in fruit; involucre-bracts ovate-oblong or ovate-lanceolate, acute or acuminate, densely strigose, about 5 mm. long; pappus-bristles 1.5–3 mm. long; achenes about 2.5 mm. long. [*M. hastata* of Urban, not of L. C. Richard.]

Hillsides and thickets at lower elevations, Porto Rico, Culebra; Tortola:—Cuba. Type from Zion Hill, Tortola (*Fishlock*, 440).

37. **SPILANTHES** Jacq. Stirp. Am. 214. 1763.

Annual branching herbs, or some species perennial, with opposite, usually toothed leaves and rather small, long-peduncled discoid and radiate heads, terminal, or in the upper axils, or rays wanting in some species. Involucre campanulate, its bracts in about 2 series, herbaceous, loosely appressed. Receptacle convex or elongated, chaffy, its chaff embracing the disk-achenes and at length falling away with them. Ray-flowers yellow or white, pistillate. Disk-flowers yellow, perfect, their corollas tubular with an expanded 4–5-cleft limb. Anthers truncate at the base. Style-branches of the disk-flowers long, sometimes penicillate at the summit. Ray-achenes 3-sided, or compressed, those of the disk-flowers compressed, margined. Pappus of 1–3 awns, or more. [Greek, spot- or stain-flower, not significant.] About 60 species, of warm and tropical regions. Type species: *Spilanthes urens* Jacq.

1. **Spilanthes iodicæa** A. H. Moore, Proc. Am. Acad. 42: 536. 1907.

Verbesina pusilla Poir. in Lam. Encycl. 8: 459. 1808. Not *Spilanthes pusilla* H. & A.

Verbesina debilis Spreng. Neue Entd. 2: 137. 1821. Not *Spilanthes debilis* H.B.K.

Eclipta pusilla DC. Prodr. 5: 491. 1836.

Stem slender, branched, decumbent, prostrate or ascending, sparsely pubescent, 4 dm. long or less. Leaves 1–4 cm. long, thin, 3-nerved, ovate to ovate-oblong, acute at the apex, mostly narrowed at the base, sparingly pubescent, slightly dentate, or entire, their petioles 8 mm. long or less; peduncles nearly filiform, 1–5 cm. long; heads ovoid, about 6 mm. high; involucre 3 mm. high, its ovate bracts ciliate; rays minute, whitish; receptacle slender, 4–5 mm. long, its scales violet-tipped. [*S. uliginosa* of Bello and of Stahl, not of Swartz.]

Wet grounds at lower and middle elevations, Porto Rico. Endemic. MALUCCO.

Spilanthes oleracea L., is recorded by Bello as formerly grown in Porto Rico gardens; it has deltoid leaves, and flower-heads 1–2 cm. high.

Spilanthes portoricensis Spreng., has not been identified by recent botanists.

38. **SALMEA** DC. Cat. Hort. Monsp. 140. 1813.

Shrubs or woody vines, the branches terete or nearly so, the leaves opposite and petioled. Heads small, corymbose, discoid. Involucre campanulate or turbinate, its bracts appressed, imbricated in few series. Involucre conic, its scales enveloping the flowers. Flowers white, all perfect and fertile; corollas with a narrowly campanulate or funnelform limb. Achenes laterally compressed, margined or narrowly winged. Pappus of 2 awns. [Commemorates

the German Count Salm-Dyck, patron of Botany.] About 15 species, natives of the West Indies and Mexico, the following typical.

1. **Salmea scandens** (L.) DC. Cat. Hort. Monsp. 141. 1813.

Bidens scandens L. Sp. Pl. 833. 1753.

Hopkirkia scandens Spreng. Syst. 3: 443. 1826.

Salmea grandiceps Cass. Dict. Sci. Nat. 47: 88. 1827.

Salmea eupatoria DC. Cat. Hort. Monsp. 141. 1813.

Verbesina scandens Klatt, Leopoldina 25: 106. 1889.

Spilanthes volubilis Sessé & Moc. Fl. Mex. ed. 2, 179. 1894.

A vine or vine-like shrub, sometimes climbing on trees to a height of 10 m., glabrous or sparingly pubescent above. Leaves ovate or oblong-ovate, smooth, rather firm in texture, 5–13 cm. long, pinnately veined, dentate or denticulate with distant, usually low teeth, acute or acuminate at the apex, rounded or narrowed at the base; heads several or numerous, corymbose or corymbose-paniculate, 6–10 mm. high; involucre-bracts short, acutish; scales of the receptacle narrow, obtuse; achenes blackish, yellowish-margined, 3 mm. long; pappus-awns roughish.

Thickets and woodlands, Porto Rico, at lower and middle elevations:—Jamaica; Cuba; Hispaniola, Trinidad, continental tropical America. BEJUCO DE MIEL. BEJUCO DE MUELA.

39. **TEPION** Adans, Fam. Pl. 2: 131, 610. 1763.

A pubescent caulescent annual herb, with broad alternate decurrent leaves, and solitary, long-peduncled heads of both tubular and radiate flowers. Involucre hemispheric, its oblong bracts in about 2 series. Ray-flowers in 2 series, pistillate, fertile, the rays short. Disk-flowers numerous, fertile, their corollas with funnelform 5-toothed limbs. Scales of the convex receptacle chartaceous. Achenes obovate, broadly winged. Pappus of 2 rigid awns, one short and straight, the other long and hooked. [Derivation not cited.] A monotypic West Indian genus.

1. **Tepion alatum** (L.) Britton, Bull. N. Y. Bot. Gard. 8: 408. 1917.

Verbesina alata L. Sp. Pl. 901. 1753.

Stem erect, simple or with a few branches, 1.5–7 dm. high. Leaves oblong, obovate or ovate-oblong, obtuse, sessile, or the lower petioled and up to 1.5 dm. long, the upper much smaller; peduncles 6–12 cm. long; heads about 1.5 cm. broad; involucre about 5 mm. high, its bracts obtusish; flowers orange; rays short; achenes 4 mm. long, ciliate and pubescent; pappus-awns 2–3 mm. long.

Waste and cultivated grounds at lower and middle elevations, Porto Rico; Vieques; St. Croix; St. Thomas:—Jamaica; Cuba; Hispaniola; Guadeloupe. Recorded from Curaçao. CAPITANEJA.

40. **XIMENESIA** Cav. Icon. 2: 60. 1793.

Pubescent caulescent herbs, with alternate or sometimes opposite, simple toothed or somewhat lacinate leaves, and solitary or few, discoid and radiate, showy peduncled heads. Involucre rather flat, of narrow spreading bracts. Receptacle convex, chaffy. Ray-flowers pistillate, fertile, numerous, the rays yellow. Disk-flowers numerous, perfect, fertile. Anthers somewhat sagittate at the base. Style-branches with slender pubescent appendages. Achenes flat, winged. Pappus of short and straight awns. [In honor of Joseph Ximenes, a Spanish botanist.] About 4 species, natives of America, the following typical.

1. **Ximenesia encelioides** Cav. Icon. 2: 60. 1793.

Verbesina encelioides Benth. & Hook.: A. Gray, Bot. Cal. 1: 350. 1876.

Annual; stem densely puberulent, much branched, 3–6 dm. high. Leaves deltoid-ovate or deltoid-lanceolate, thin, 5–10 cm. long, acuminate acute or blunt at the apex, coarsely dentate, or even lacinate, green and minutely pubescent above, densely canescent beneath, all alternate, or the lowest opposite, narrowed at the base into naked or wing-margined petioles; heads several or numerous, 2.5–5 cm. broad; involucre hemispheric, about 12 mm. high, its bracts lanceolate, canescent; rays 12–15, bright golden yellow, 3-toothed; achenes of the disk-flowers obovate, winged, pubescent, their pappus of 2 subulate awns, those of the ray-flowers rugose, thickened, often wingless.

Collected by Gundlach many years ago near Quebradillas, Porto Rico;—Florida; Cuba; Bahamas. Native of the southwestern United States and Mexico. GOLDEN CROWN-BEARD.

41. **SYNEDRELLA** Gaertn. Fr. & Sem. 2: 456. 1791.

Annual, pubescent herbs, with opposite dentate petioled leaves, and small, solitary or glomerate, axillary or terminal heads of radiate and tubular flowers. Involucre oblong, of few bracts, the outer 1 or 2 foliaceous, the inner paleaceous. Receptacle small, the scarious narrow chaff subtending the disk-flowers. Ray-flowers pistillate, with a filiform tube and a short 2–3-toothed limb; disk-flowers perfect, the corolla tubular, 4-cleft. Ray-achenes compressed, 2-winged, the wings produced into awns, those of the disk-flowers narrower, 2–3-aristate. [Greek, referring to the clustered flower-heads.] Two known species, natives of tropical America, the following typical.

1. **Synedrella nodiflora** (L.) Gaertn. Fr. & Sem. 2: 456. 1791.

Verbesina nodiflora L. Cent. Pl. 1: 28. 1755.

Ucacou nodiflorum Hitchc. Rep. Mo. Bot. Gard. 4: 100. 1893.

Stem appressed-pubescent above, glabrate below, rather widely branched, 3–8 dm. high. Leaves thin, ovate to elliptic, 3–10 cm. long, triplinerved, low-serrate, acute at the apex, narrowed at the base into short margined petioles, loosely appressed-pubescent above, rather densely appressed-pubescent beneath; heads few or several together in nearly sessile axillary or terminal clusters; involucre about 8 mm. high, its 1 or 2 outer bracts pubescent, oblong-lanceolate, the inner narrower, glabrous; achenes 4–5 mm. long, those of the ray-flowers with ascending marginal bristles and 2 short awns, those of the disk-flowers with 2 subulate awns.

Fields, hillsides, waste and cultivated grounds, Porto Rico; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola;—Florida (introduced); West Indies; continental tropical America; introduced into the Old World tropics. SARBATANA. NODEWEED.

42. **BIDENS** L. Sp. Pl. 831. 1753.

Annual or perennial herbs, or vines, with opposite serrate divided or dissected leaves, or the uppermost alternate, and mostly large heads of both tubular and radiate flowers, or the rays none, or rudimentary. Involucre campanulate or hemispheric, its bracts in 2 series, distinct or slightly united at the base, the outer often foliaceous and much larger than the inner. Receptacle flat or nearly so, chaffy, the chaff subtending the disk-flowers. Rays, when present, neutral, mostly entire, yellow or white. Disk-flowers perfect, fertile, their corollas tubular, 5-toothed. Anthers entire, or minutely sagittate at the base. Style-branches with short or subulate tips. Achenes flat, quadrangular or nearly terete, cuneate,

oblong, or linear. Pappus of 2-6 teeth or subulate awns, upwardly or downwardly barbed or hispid. [Latin, two-toothed, referring to the achenes.] Perhaps 125 species of wide distribution. Type species: *Bidens tripartitus* L.

Erect annual herbs.

Leaves 1-3-pinnate; achenes narrowed above, 7-17 mm. long; rays yellow.

1. *B. cynapiifolia*.

Leaves 3-divided, rarely simple; achenes nearly columnar, 5-8 mm. long; rays white.

2. *B. pilosa*.

Perennial vines; rays yellow.

Leaves or leaflets toothed or incised.

3. *B. reptans*.

Leaves 2-3-pinnatisect.

4. *B. Urbanii*.

1. *Bidens cynapiifolia* H.B.K. Nov. Gen. 4: 235. 1820.

Bidens portoricensis Spreng.; DC. Prodr. 5: 601. 1836.

Bidens cynapiifolia portoricensis O. E. Schulz in Urban, Symb. Ant. 7: 131. 1911.

Bidens cynapiifolia tenuis O. E. Schulz, loc. cit. 1911.

Annual; stem quadrangular, erect, branched, 0.2-2 m. high. Leaves thin, petioled, 1-3-pinnately dissected into ovate or oblong, toothed or lobed segments; heads usually numerous, long-peduncled, 4-8 mm. broad; involucre narrow, its outer bracts linear, ascending, nearly as long as the broader erect inner ones; rays 3-4, yellow, short, sometimes none; achenes curved, linear, 4-angled, narrowed upward, 7-17 mm. long, the outer ones commonly shorter than the inner; pappus of 4-6 downwardly barbed, slightly spreading awns, much shorter than the achene. [*Bidens bipinnata* of West, of Bello, of Stahl, of Krebs, of Eggers, of Millspaugh and of Urban, not of Linnaeus.]

Fields, banks, hillsides and cultivated grounds, at lower and middle altitudes, Porto Rico; Mona; Culebra; Vieques; St. Croix; St. Thomas; St. Jan; Tortola; Virginia Gorda:—West Indies; continental tropical America. BEGGAR-TICKS.

2. *Bidens pilosa* L. Sp. Pl. 832. 1753.

Coreopsis leucantha L. Sp. Pl. ed. 2, 1282. 1763.

Bidens leucantha Willd. Sp. Pl. 3: 1719. 1804.

Bidens pilosa dubia O. E. Schulz in Urban, Symb. Ant. 7: 135. 1911.

? *Bidens pilosa subbiternata* Kuntze, Rev. Gen. Pl. 322. 1891.

Annual, glabrous or somewhat pubescent, 3-10 dm. high, more or less branched. Leaves petioled, 3-divided, their segments ovate to lanceolate, 2-8 cm. long, serrate, acute or acuminate, the uppermost sometimes undivided; involucre campanulate, about 8 mm. high, its outer bracts linear-oblong, usually shorter than the inner; rays, when present, white, 1-2 cm. long, 2-3-lobed; achenes columnar-fusiform, unequal, the inner longer than the involucre; pappus of 2-4 yellow, downwardly barbed awns.

Fields, banks, hillsides, waste and cultivated grounds, Porto Rico; St. Croix; St. Thomas; St. Jan:—southern United States; Bermuda; West Indies; continental tropical America; Old World tropics. A common weed, the white rays usually present. ROMERILLO. MARGARITA. SHEPHERD'S NEEDLE.

3. *Bidens reptans* (L.) G. Don.; Sweet, Hort. Brit. ed. 3, 360. 1839.

Coreopsis reptans L. Syst. ed. 10, 1228. 1759.

Bidens coreopsidis DC. Prodr. 5: 599. 1836.

Bidens reptans bipartitus O. E. Schulz in Urban, Symb. Ant. 7: 141. 1911.

A vine, up to 5 m. long or longer, glabrous, or sparingly pubescent above. Leaves simple, trifoliate, or rarely pinnately 5-foliate; petioles slender, 1-4 cm. long; leaves or leaflets lanceolate to ovate, thin, serrate, 3-7 cm. long, acuminate, the base obtuse, narrowed or subcordate; heads few or several, cymose-paniculate; peduncles 0.5-5 cm. long; involucre about 7 mm. long, its outer bracts linear, acute, becoming recurved; rays yellow, 10-17 mm. long, obtuse; achenes

linear, 6–10 mm. long, the 2 or 3 pappus-bristles downwardly barbed. [*B. rubifolia* of Cook and Collins, not H.B.K.]

Banks, woods and thickets at middle and higher altitudes in moist districts of Porto Rico:—Jamaica; Cuba; Antigua to St. Vincent; Mexico to Venezuela.

4. ***Bidens Urbanii*** Greenman, Field Mus. Bot. 2: 271. 1907.

Bidens reptans Urbanii O. E. Schulz in Urban, Symb. Ant. 7: 141. 1911.

A slender branched vine, 2–8 m. long, the terete branches puberulent when young, or glabrous. Leaves slender-petioled, ovate in outline, 5–8 cm. long, 2–3 pinnatisect, glabrous or nearly so, the ultimate segments oblong to lanceolate, 5–20 mm. long, acute or some of them obtuse; heads few, cymose-paniculate; peduncles slender, 1–3 cm. long; involucre 8–10 mm. long, its outer bracts linear to linear-spatulate, acute or obtusish, reflexed, the inner lanceolate; rays yellow, 10–15 mm. long, obtuse or retuse, or sometimes wanting; achenes linear, about 10 mm. long, the 2–4 pappus-awns downwardly barbed. [*B. portoricensis* of Bello, not of Sprengel.]

Forests and thickets in the western mountains of Porto Rico. Endemic.

Bidens heterophylla Ortega, a Mexican species, was listed by Krebs from St. Thomas, doubtless in error.

43. **COSMOS** Cav. Icon. 1: 9. 1791.

Annual or perennial herbs, with opposite, mostly pinnatifid leaves, and long-peduncled heads of both radiate and tubular flowers, the rays rose-color in our native species, the disk-flowers yellow or yellowish. Bracts of the involucre in 2 series. Ray-flowers in a single series, neutral; disk-flowers perfect and fertile. Receptacle flat, its scales flat or concave. Achenes narrow, somewhat angled, distinctly beaked. Pappus of 2–4 retrorsely barbed or hispid awns. [Greek, decorative.] About 12 species, natives of tropical America. Type species: *Cosmos bipinnatus* Cav.

1. ***Cosmos caudatus*** H.B.K. Nov. Gen. 4: 240. 1820.

Bidens Berteriana Spreng. Syst. 3: 454. 1826.

Bidens artemisiaefolius caudatus Kuntze, Rev. Gen. Pl. 321. 1891.

Perennial; stem erect, 0.5–2 m. high, sparingly pubescent with scattered long hairs, or glabrate, the slender branches erect-ascending. Leaves thin, glabrous or nearly so, bipinnate, the lower sometimes 15 cm. long, their ultimate segments ovate to lanceolate, acute or acuminate, roughish-margined; petioles ciliate, those of lower leaves slender; involucre 12–15 mm. high, its outer bracts linear-lanceolate, acuminate, ciliate, about as long as the linear-oblong glabrous inner ones; rays rose, 1–2 cm. long; achenes linear, 10–15 mm. long, narrowed into a slender, upwardly hispid beak as long as the body or longer; awns 2, spreading, 2–3 mm. long.

Banks, fields and roadsides at lower and middle elevations; Porto Rico; Vieques; St. Croix; St. Thomas; St. Jan; Tortola:—Florida; West Indies (except Bahamas); continental tropical America. MARGARITA. CLAVEL. WILD COSMOS. SPANISH NEEDLES.

Cosmos aurantiacus Klatt, of Central America, was recorded by Urban as formerly grown in a garden near Añasco, Porto Rico.

Cosmos sulphureus Cav., PANCHITAS, Mexican, commonly grown for ornament in Porto Rico and Virgin Island gardens, has bright yellow rays 2–3 cm. long.

44. **GALINSOGA** R. & P. Fl. Per. 110. 1794.

Annual branching herbs, with opposite, mostly petioled leaves, and small peduncled heads of both tubular and radiate flowers, terminal and in the upper axils. Involucre hemispheric or broadly campanulate, its bracts in 2 series, ovate, obtuse, membranous, striate, nearly equal, or the outer shorter. Receptacle conic or elongated, its thin chaff subtending the disk-flowers. Ray-flowers white, pistillate, fertile, the rays 4 or 5, short. Disk-flowers yellow, perfect, the corolla 5-toothed. Anthers minutely sagittate at the base. Style-branches tipped with acute appendages. Achenes angled, or the outer ones flat. Pappus of the disk-flowers of several short laciniate or fimbriate scales, that of the ray-flowers of several or few short slender bristles or none. [Named in honor of M. M. Galinsoga, superintendent of the Botanic Gardens at Madrid.] About 6 species, natives of tropical and warm temperate America.

Ray-flowers purple.
Ray-flowers white.

1. *G. caracasana*.
2. *G. ciliata*.

1. **Galinsoga caracasana** (DC.) Sch. Bip. Linnaea 34: 529. 1866.

Vargasia caracasana DC. Prodr. 5: 676. 1836.

Slender, 2–4 dm. high, pilose and more or less glandular. Leaves ovate, crenate-dentate, 3–6 cm. long, acute or short-acuminate, the base narrowed or obtuse, the pilose petioles about 2 cm. long or shorter; peduncles slender, 5–20 mm. long; involucre-bracts obtuse, strongly veined, about 3 mm. long; ray-flowers purple or purplish; disk-flowers yellow; pappus-scales of ray-flowers narrowly lanceolate, fimbriate, that of the disk-flowers similar.

Naturalized in waste and cultivated grounds in the central and western mountains of Porto Rico. Native of Central America and northern South America. Adventive in the eastern United States.

2. **Galinsoga ciliata** (Raf.) Blake, Rhodora 24: 35. 1922.

Adventina ciliata Raf. New Fl. 1: 67. 1836.

Slender, 1.5–5 dm. high, white-pilose, especially about the nodes. Leaves ovate, 2–8 cm. long, slender-petioled, usually rather coarsely dentate, acute, the base narrowed; peduncles slender, glandular-pilose, 0.5–3 cm. long; ray-flowers white; involucre-bracts about 2.5 mm. long, faintly veined; pappus-scales of the ray-flowers narrowly linear, minutely fimbriate, that of the disk-flowers aristate, fimbriate.

Cultivated ground near Río Piedras Porto Rico, 1924. Native of Central and South America; widely naturalized as a weed in the eastern United States.

45. **TRIDAX** L. Sp. Pl. 900. 1753.

Perennial herbs, with opposite, dentate or incised leaves, and long-peduncled heads of tubular and radiate flowers, the disk-flowers perfect and fertile, the ray-flowers pistillate, the rays often 3-lobed. Involucre ovoid to hemispheric, its nearly equal bracts in few series, or the outer smaller than the inner. Receptacle flat or convex, the chaff subtending the disk-flowers. Anthers auricled at the base or sagittate. Style-branches of the disk-flowers subulate-appendaged. Achenes silky-villous. Pappus of many aristate plumose scales. [Greek, referring to the 3-lobed rays.] About a dozen species, natives of tropical America, the following typical.

1. ***Tridax procumbens*** L. Sp. Pl. 900. 1753.

Hirsute, branched from the base, the branches spreading or ascending, slender, 2–5 dm. long. Leaves ovate to ovate-lanceolate, short-petioled, 2–6 cm. long, incised-dentate, acute or acuminate at the apex, mostly cuneate at the base; peduncles solitary, terminal, 1–3 dm. long; involucre subcampanulate, about 6 mm. high, its bracts hispid, the inner elliptic, the outer lanceolate; rays nearly white; achenes about 2 mm. long.

Hillside pastures and waste grounds, near Vega Baja, Porto Rico; St. Croix:—Florida; Bahamas; Cuba; Grenada; Trinidad; continental tropical America.

46. ***TAGETES*** L. Sp. Pl. 887. 1753.

Annual glanduliferous herbs, mostly erect, branched, with pinnate or simple opposite leaves and large or small peduncled heads of radiate and tubular flowers, usually yellow or orange. Involucre of few partly united bracts in a single series. Receptacle flat, naked or fimbriate. Ray-flowers pistillate, the rays entire or 2-lobed. Disk-flowers perfect, tubular, with a somewhat expanded limb; anthers appendaged. Achenes linear, compressed or angled, bearing a callus at the base. Pappus various. [Tages, an Etrurian deity.] About 30 species, natives of continental America, from Arizona to Argentina. Type species: *Tagetes patula* L.

1. ***Tagetes erecta*** L. Sp. Pl. 887. 1753.

Glabrous, often much branched, 8 dm. high or less. Leaves pinnately divided, somewhat petioled, the lower 10–15 cm. long; leaf-segments narrowly oblong to oblong-lanceolate, gland-dotted, sharply serrate, acute, 1.5–2.5 cm. long, or the lower ones much smaller; heads solitary at the ends of the branches, 2.5–4.5 cm. broad; peduncles 4–10 cm. long, swollen below the heads; involucre 1.5–2 cm. high, its bracts united to near the summit; rays 10–20 cm. long or longer, yellow.

Occasional in fields and waste grounds, Porto Rico:—Florida; Cuba; Jamaica. Native of Mexico. Cultivated in Porto Rico and Virgin Islands gardens.

Tagetes patula L. MARIGOLD, Mexican, occasionally grown in Porto Rico and Virgin Island flower-gardens, has peduncles only slightly enlarged, below the heads, the rays 8–10 mm. long, the involucre 1–1.5 cm. high.

47. ***POROPHYLLUM*** Vaill.; Adans. Fam. Pl. 2: 122. 1763.

Herbs, or some species shrubby, glanduliferous, glabrous and often glaucous. Leaves alternate, or the lower opposite, toothed or entire. Heads corymbose or solitary, long-stalked. Involucre narrowly campanulate or cylindric, its bracts 5–9. Receptacle small, not chaffy. Ray-flowers none. Disk-flowers perfect and fertile; corollas with a slender tube and narrowly campanulate limb. Achenes linear, many-striate, glabrous or pubescent. Pappus of copious capillary roughish bristles in 1 or 2 series. [Greek, porose-leaved.] About 25 species, natives of warm temperate and tropical America. Type species: *Cacalia Porophyllum* L. The plants are known as YERBA DE CABRO.

Achenes glabrous; pappus brown.
Achenes pubescent; pappus yellowish-white.

1. *P. leiocarpum*.
2. *P. Porophyllum*.

PARTS ISSUED

VOLUME I (complete in four parts with index).

- Part 1. History of the Survey by N. L. Britton.
Geological Introduction by C. P. Berkey.
Geology of the San Juan District with colored map
by D. R. Semmes.
- Part 2. Geology of the Coamo-Guayama District with colored
map by E. T. Hodge.
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- Part 1. Descriptive Flora—Spermatophyta (Continued).
- Part 2. Descriptive Flora—Spermatophyta (Continued).

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SCIENTIFIC SURVEY

OF

Porto Rico and the Virgin Islands

VOLUME VI—Part 3

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Descriptive Flora—Spermatophyta, with Appendix (Concluded)

N. L. Britton and Percy Wilson

Descriptive Flora—Pteridophyta

William R. Maxon



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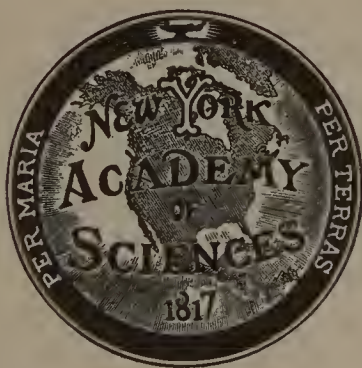
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1. **Porophyllum leiocarpum** (Urban) Rydb. N. A. Fl. **34**: 184. 1916.

Porophyllum macrocephalum leiocarpum Urban, Symb. Ant. **1**: 466. 1899.

Annual, strongly odorous; stem erect, branched, 4–8 dm. high, terete and glaucous. Leaves thin, oval to orbicular-obovate, rounded and obtuse at the apex, 4.5 cm. long or less, entire or with few rounded teeth and with oblong marginal glands, the slender petioles often nearly as long as the blades, heads solitary at the ends of the branches, 24–45-flowered; involucre of 5 linear-lanceolate obtuse or acutish bracts about 2 cm. long; corolla about 12 mm. long; achenes black, glabrous, narrowed at each end, 10 mm. long, a little longer than the brown pappus.

Thickets, banks and hillsides at lower and middle elevations in dry regions, central and western districts of Porto Rico. Endemic. YERBA DE PEO.

2. **Porophyllum Porophyllum** (L.) Kuntze, Rev. Gen. Pl. **3**²: 168. 1898.

Cacalia Porophyllum L. Sp. Pl. 834. 1753.

Kleinia ruderalis Jacq. Enum. 28. 1760.

Porophyllum ellipticum Cass. Dict. Sci. Nat. **43**: 56. 1826.

P. ellipticum genuinum and *ruderales* Urban, Symb. Ant. **1**: 467, 468. 1899.

Annual, not strongly odorous; stem erect, often much branched, pale, slightly glaucous, 1 m. high or less. Leaves thin, slender-petioled, oblong or ovate, obtuse or acute, low-crenate or entire, 2–7 cm. long, bearing marginal glands or sometimes glandless; heads solitary at the ends of the branches, many-flowered; involucre about 2 cm. high, its 5 bracts linear, acute, bearing narrowly linear glands; corolla about 10 mm. long; achenes linear, about 8 mm. long, dark brown, hispidulous; pappus yellowish.

Roadsides, clearings and cultivated grounds, Porto Rico; St. Thomas;—West Indies; continental tropical America. YERBA POROSA.

48. **PECTIS** L. Syst. ed. 10, 1221. 1759.

Annual or perennial, diffuse prostrate or erect, mostly glabrous herbs, gland-dotted and strong-scented, with opposite narrow, sometimes bristly-ciliate leaves, and small, usually cymose heads of both tubular and radiate yellow flowers. Involucre cylindric, oblong or campanulate, its bracts in 1 series, narrow, keeled. distinct. Receptacle small, naked. Ray-flowers pistillate, the rays small, entire or 3-lobed. Disk-flowers perfect, their corollas with expanded, somewhat irregularly 5-cleft limbs. Anthers entire at the base. Style-branches of the disk-flowers very short, obtuse. Achenes linear, slightly angled, striate. Pappus of scales, slender bristles or awns, sometimes with a few outer smaller additional ones. [Latin, *pecten*, comb, referring to the pappus.] About 75 species, natives of the warmer parts of America. Type species: *Pectis linifolia* L.

Pappus-awns lanceolate-aristate, erect.

Involucre-bracts obtuse, subtruncate or emarginate; heads sessile or short-peduncled.

Plants prostrate.

Involucre-bracts 3; leaves linear-oblong to lanceolate.

Involucre-bracts 5.

Leaves oblanceolate to obovate.

Leaves linear to oblong.

Plants, or their branches, erect or ascending.

Low, 3 dm. high or less; heads few together or solitary.

Tall, stout, up to 4.5 dm. high; heads densely leafy, glomerate.

Involucre-bracts acuminate; heads on long filiform peduncles.

Pappus-awns few, subulate, spreading or reflexed.

1. *P. tenuicaulis*.

2. *P. humifusa*.

3. *P. portoricensis*.

4. *P. ciliaris*.

5. *P. carthusianorum*.

6. *P. febrifuga*.

7. *P. linifolia*.

1. *Pectis tenuicaulis* Urban, Symb. Ant. 1: 468. 1899.

Tufted, at length prostrate; stems several or many, slender, short-pilose, 1.5 dm. long or less, branched. Leaves linear-oblong to oblong-lanceolate, 5–15 mm. long, obtuse or mucronate, bearing a few long bristles near the base; heads few or solitary at the ends of the branches, sessile or on peduncles up to 2 mm. long; involucre about 5 mm. long, its 3 bracts obovate-oblong, obtuse, subtruncate or apiculate, bluntly keeled; flowers yellow, 3 of them radiate, 4 or 5 tubular; pappus of 2 to 5 narrowly lanceolate, setaceous-acuminate awns; achenes short-pilose, 2–3 mm. long.

Banks and roadsides at lower elevations in dry regions of the southwestern districts of Porto Rico:—Antigua; Martínique.

2. *Pectis humifusa* Sw. Prodr. 114. 1788.

Prostrate; stems often many, 4 dm. long or less, short-pilose. Leaves oblanceolate to obovate, 12 mm. long or less, obtuse or acutish, with 2–6 bristles near the base; heads solitary at the ends of the branches, sessile or sometimes short-peduncled; involucre 3.5–6 mm. high, its 5 bracts oblong to ovate-orbicular, keeled, obtuse or emarginate; flowers yellow, 5 of them usually radiate, 10–25 tubular; pappus of few or numerous lanceolate, setaceous acuminate awns; achenes about 3 mm. long, glabrate or somewhat pilose.

Sandy banks and fields, Porto Rico, at lower elevations; Vieques; St. Croix; St. Thomas; St. Jan.:—Hispaniola; Anguilla to Barbados. YERBA DE SAN JUAN.

3. *Pectis portoricensis* Urban, Symb. Ant. 5: 276. 1907.

Branched from the base, the branches slender, prostrate or procumbent, rooting below, 7–15 cm. long, short-pilose. Leaves narrowly oblong or linear, 10–15 mm. long, acutish or obtuse, sessile or slightly cuneate, the margins with 5–12 pairs of bristles, the small glands scattered; heads solitary or 2 or 3 together, short-peduncled; involucre about 5 mm. long, its 5 oblong bracts rounded or subtruncate; ray-flowers 5, the rays about 1.5 mm. long; disk-flowers 5 or 6 with tubular corollas; pappus-scales 5, those of the disk-flowers about equal, those of the ray-flowers very unequal; achenes about 3 mm. long.

Collected by Sintenis in the plaza of Guayama in 1885. Endemic. Search for this plant at the type locality, in 1924, failed to detect it.

4. *Pectis ciliaris* L. Syst. ed. 10, 1221. 1759.

Erect or ascending, slender, 1.5–3 dm. high, branched, pilose in lines. Leaves linear to linear-oblong, 1–3.5 cm. long, obtuse or acutish, connate at base, bearing 4–12 pairs of marginal bristles, the glands scattered; heads 2–8 together at the ends of the branches, short-peduncled or sessile, or the peduncles sometimes 3 cm. long; involucre about 5 mm. long, its 5 bracts oblong or linear-oblong, obtuse or rounded; ray-flowers about 5, with rays 2 mm. long; disk-flowers 4–12, their corollas 2–3 mm. long; pappus-scales of the ray-flowers 2 or 3, narrowly lanceolate, aristate, those of the disk-flowers usually 5, similar; achenes 3 mm. long.

Fields and banks, dry southern districts of Porto Rico:—Jamaica; Cuba; Hispaniola.

5. *Pectis carthusianorum* Less. Linnaea 6: 712. 1831.

Erect, rather stout, 2–4.5 dm. high, simple or with few nearly erect branches. Leaves linear to linear-oblong, 2–4.5 cm. long, mostly obtuse, crenate at base, with 2–9 pairs of marginal bristles, the glands scattered; heads glomerate at the ends of the branches, sessile; involucre about 5 mm. long, its 5 bracts oblong, obtuse or subtruncate; ray-flowers 5, with rays 2–2.5 mm. long; disk-flowers 7–9, their corollas about 3 mm. long; pappus-scales of the ray-flowers 3 or 4, linear-

lanceolate, aristate, those of the disk-flowers 5, similar; achenes about 4 mm. long.

Banks and hillsides, western districts of Porto Rico, at lower elevations:—Cuba; Hispaniola.

6. **Pectis febrifuga** van Hall, Ann. Hort. & Bot. 4: 33. 1861.

Erect, 0.5–2.5 dm. high, much branched, the branches very slender, angular, puberulent. Leaves narrowly linear, or the lower linear-lanceolate, about 2 cm. long or shorter, sessile, acute or mucronate, with 3–5 pairs of bristles near the base, the glands mostly in a row along the margin; heads solitary, filiform-peduncled, the peduncles 1.5–3 cm. long, involucre about 4 mm. long, its 5 bracts oblong-lanceolate to linear-lanceolate, acuminate; ray-flowers 5, with yellow rays 1–1.5 mm. long; disk-flowers 6–13, the corollas about 2 mm. long; pappus-scales of the ray-flowers usually 2, subulate, short, those of the disk-flowers 4–6, lanceolate, aristate; achenes 2–2.5 mm. long. [? *P. ciliaris* of Krebs; *P. Swartziana* of Borgesen and Paulsen, not of Lessing.]

Banks and plains, western districts of Porto Rico, at low elevations; St. Croix; St. Thomas; Virgin Gorda:—Jamaica; Cuba; Bonaire; Curaçao; Aruba; Costa Rica to Venezuela.

7. **Pectis linifolia** L. Syst. ed. 10, 1221. 1759.

Pectis punctata Jacq. Enum. 28. 1760.

Pectidium punctatum Less. Linnaea 6: 707. 1831.

Annual; stems glabrous, very slender, usually much-branched, 2–9 dm. high. Leaves linear, 2–8 cm. long, usually not more than 3 mm. wide, narrowed at both ends, sparingly glanduliferous, commonly bearing 1–3 bristles at the base; heads on filiform peduncles 7–35 mm. long, 5–9-flowered; involucre about 6 mm. long, its 4 or 5 linear glabrous bracts obtuse, with revolute margins; flowers purplish to orange; achenes linear, 4–6 mm. long, glabrous or sparingly pubescent; pappus of 2–4 subulate, spreading or reflexed awns about 2 mm. long.

Banks and hillsides, Porto Rico, at lower and middle elevations, most abundant in dry districts; Culebra; Vieques; Muertos; Desecheo; St. Croix; St. Thomas; St. Jan; Virgin Gorda:—West Indies, south to Grenada and Curaçao; tropical continental America.

49. **NEUROLAENA** R. Br. Trans. Linn. Soc. 12: 120. 1817.

Tall shrubby perennials, with large alternate leaves and numerous small, corymbose-paniculate heads of tubular yellow flowers, all perfect and fertile. Involucre campanulate, its obtuse bracts imbricated in 3 or 4 series. Receptacle nearly flat, with membranous 1-nerved scales which are early deciduous. Corolla-tube slender, the limb somewhat expanded. Anthers sagittate. Achenes narrowed at the base. Pappus of many capillary persistent somewhat unequal bristles. [Greek, referring to the nerved bracts.] Two known species of tropical America, the following typical.

1. **Neurolaena lobata** (L.) R. Br.; DC. Prodr. 6: 292. 1837.

Conyza lobata L. Sp. Pl. 862. 1753.

Stems somewhat woody, erect, usually much branched, 1.5–3 m. high, appressed-pubescent and scabrous, dentate, denticulate or variously lobed, acuminate at the apex, narrowed at the base, the lower up to 3 dm. long and petioled, the upper much smaller, sessile or nearly so; corymbs terminal, often 8 cm. broad or more; peduncles rather slender, bracted, pubescent; involucre 6–8 mm. high,

its bracts oblong, pubescent, 3-nerved, the outer shorter than the inner; achenes pubescent; pappus brownish-white.

Thickets, hillsides and woodlands, Porto Rico, ascending into the Luquillo Mountains; St. Thomas; Tortola:—Jamaica; Cuba; Hispaniola; Saba to Trinidad; continental tropical America. SEPI.

50. **ERECHTITES** Raf. Fl. Ludov. 65. 1817.

Erect, usually branching herbs, with alternate leaves, and (in our species) rather large, discoid, many-flowered heads of whitish flowers, corymbose-paniculate at the ends of the stem and branches. Involucre cylindric, swollen at the base, its principal bracts in 1 series, linear, with or without much smaller outer ones. Receptacle concave, naked. Marginal flowers in 2—several series, pistillate, fertile, their corollas filiform, the limb 2—4-toothed. Central flowers perfect, fertile; corolla narrowly tubular, the limb 4—5-toothed, the style-branches elongated, truncate or obtuse at the summit. Anthers obtuse and entire at the base. Achenes linear-oblong, angled or striate. Pappus of copious capillary soft smooth white bristles. [Ancient name of some groundsel.] About 12 species, natives of America and Australasia. Type species: *Erechtites praealta* Raf.

1. **Erechtites hieracifolia** (L.) Raf.; DC. Prodr. 6: 294. 1837.

Senecio hieracifolius L. Sp. Pl. 866. 1753.

Erechtites praealta Raf. Fl. Ludov. 65. 1817.

E. hieracifolia cacalioides Eggers, Bull. U. S. Nat. Mus. 13: 66. 1879.

Annual, glabrous, or somewhat hirsute; stem striate, succulent, usually branched, 3–25 dm. high. Leaves thin, lanceolate or ovate-lanceolate, dentate and often deeply incised, 5–20 cm. long, the upper sessile or auriculate-clasping, mostly acuminate, the lower usually narrowed into petioles; heads 12–20 mm, long, about 6 mm. in diameter, the involucre conspicuously swollen at the base before flowering, its bracts numerous, striate, green, with narrow scarious margins; pappus bright white.

Banks, fields, waste and cultivated grounds, Porto Rico; St. Croix; St. Thomas; Tortola:—continental temperate and tropical America; West Indies: FIRE-WEED. ACHICORTA DE CABRA.

51. **EMILIA** Cass. Bull. Soc. Philom. 1817: 68. 1817.

Herbs, with alternate and basal, often clasping leaves, and long-peduncled, solitary or loosely corymbose heads of pink, purple or orange, scarlet or white, tubular, perfect and fertile flowers. Involucre nearly cylindric, its bracts in a single equal series. Receptacle flat, naked. Corolla-limb cylindric. Achenes nearly terete or 5-angled. Pappus of numerous, soft, white capillary bristles. [Name unexplained.] About 5 species, natives of the Old World tropics. Type species: *Emilia flammea* Cass.

Involucre narrow, about 3 mm. thick; flowers rose to purple or white. 1. *E. sonchifolia*.
Involucre 4–6 mm. thick; flowers red to scarlet or crimson. 2. *E. coccinea*.

1. **Emilia sonchifolia** (L.) DC. Prodr. 6: 302. 1837.

Cacalia sonchifolia L. Sp. Pl. 835. 1753.

Annual, glabrous, or somewhat pubescent below, usually branched, 2–7 dm. high. Basal and lower leaves petioled, sometimes 12 cm. long, obovate to oblanceolate, repand-dentate to lyrate-pinnatifid, obtuse or acute at the apex; upper leaves lanceolate, sessile, sagittate-clasping, dentate-lobed, or entire; heads

loosely corymbose, many-flowered; peduncles very slender or filiform; involucre 8–12 mm. high, about 3 mm. thick, its bracts linear-lanceolate, acute, at length reflexed; flowers rose, violet, purple, or sometimes white.

Fields, banks, waste and cultivated grounds, Porto Rico; Vieques; Culebra; St. Croix; St. Thomas; St. Jan; Tortola:—Florida; West Indies; continental tropical America; Old World tropics.

2. **Emilia coccinea** (Sims) Sweet, Hort. Brit. ed. 3, 382. 1839.

Cacalia coccinea Sims, Bot. Mag. pl. 564. 1802.

Annual, similar to the preceding species, the basal and lower leaves variously dentate, ovate to suborbicular, often with margined petioles; upper leaves sagittate-clasping, dentate or entire; heads few to several; involucre 7–13 mm. high, 4–6 mm. thick; flowers red, scarlet or crimson.

Waste and cultivated grounds, Porto Rico; St. Croix:—Florida; Bermuda; West Indies; Panama; northern South America; Pacific Islands.

52. **CIRSIIUM** [Tourn.] Mill. Gard. Dict. abr. ed. 4. 1754.

Erect, branched or simple, prickly herbs, some species acaulescent, with alternate or basal, sinuate-dentate lobed or pinnatifid, usually very spiny leaves, sometimes decurrent, and large many-flowered, solitary or clustered, discoid heads of purple, yellow or white, tubular, perfect and fertile, or rarely dioecious flowers. Involucre ovoid or globose, its bracts prickly-tipped or unarmed, imbricated in many series. Receptacle flat or convex, bristly. Corolla-tube slender, the limb deeply 5-cleft. Filaments pilose, or rarely glabrous. Anthers sagittate at the base. Style-branches short or elongated, obtuse. Achenes obovate or oblong, compressed or obtusely 4-angled, glabrous, smooth or ribbed. Pappus of several series of slender, plumose, bristles, connate at the base. [Greek, the thistle was used as a remedy for swollen veins.] Over 200 species, widely distributed in the northern hemisphere. Type species: *Carduus heterophyllus* L.

1. **Cirsium mexicanum** DC. Prodr. 6: 636. 1837.

Carduus mexicanus Moric.; DC. Prodr. 6: 637. 1837.

Cnicus portoricensis Kuntze, Rev. Gen. Pl. 329. 1891.

Cirsium portoricense Petrak, Beih. Bot. Centr. 27²: 237. 1910.

Biennial, or perhaps, perennial; stem rather stout, simple or sparingly branched, sometimes 2 m. high, usually lower, striate, sparingly pubescent. Leaves lanceolate or oblong-lanceolate in outline, the lower up to 2 dm. long, pinnatifid, green and glabrous or nearly so above, densely white-tomentulose beneath, the lobes triangular, spinulose-tipped and spinulose-dentate, the base long-decurrent on the stem and also spinulose; heads solitary or several together, 3–5 cm. broad; involucre about 2.5 cm. high, its bracts linear-lanceolate the outer 3 or 4 series spinulose-tipped, the inner ones long-acuminate flowers purple.

Grassy banks and hillsides, Porto Rico, at lower and middle elevations in moist regions:—Cuba; Hispaniola; Martinique; Mexico and Central America. **CARDO.**
THISTLE.

53. **PROUSTIA** Lag. Amen. Nat. 1: 33. 1811.

Shrubs or woody vines, with alternate, toothed or entire leaves, and thyrsoïd or paniced heads of few perfect and fertile flowers, the corolla 2-lipped. Involucre-bracts imbricated in several series, the outer much shorter than the inner. Receptacle small, naked, or fimbriate. Anthers sagittate. Achenes 5–7-ribbed.

Pappus of numerous soft capillary bristles. [Commemorates Proust, a Spanish chemist.] About 10 species, of tropical America. Type species: *Proustia pyrifolia* Lag.

1. **Proustia Krugiana** Urban, Symb. Ant. 1: 471. 1899.

A shrub with long slender terete branches, or vine-like, up to 4 m. long, the young twigs finely pubescent. Leaves ovate to oblong-lanceolate, firm in texture, 3–9 cm. long, 4 cm. wide or less, denticulate or entire, acute or acutish at the apex, obtuse or cordate at the base, pinnately veined, scabrous and strongly reticulate-veined above, densely appressed-pubescent beneath or becoming glabrate, the petioles 1.5–4 mm. long; heads several or numerous in terminal corymbs; involucre about 8 mm. high, its bracts pubescent, obtuse or acute, the inner linear or linear-lanceolate, the outer ovate to oblong; flowers about 7 in each head, very fragrant; corolla yellow; achenes about 6 mm. long, narrowly linear; pappus straw-color.

Banks and woodlands in relatively dry districts, southern and southwestern districts of Porto Rico. Endemic.

54. **CHAPTALIA** Vent. Jard. Cels. pl. 61. 1800.

Perennial scapose herbs, with floccose-tomentose foliage. Leaves basal, persistently pubescent beneath. Heads radiate, solitary and terminal. Involucre many-flowered, its bracts narrow, in few series, the inner successively larger. Ray-flowers pistillate, fertile, white to purple. Disk-flowers perfect, wholly or partially neutral, their corollas white or purplish, more or less 2-lipped, the outer with 3 lobes to the lower lip, the inner with 2 lobes. Achenes 5-nerved, columnar or fusiform. Pappus of numerous soft hair-like bristles. [In honor of J. A. C. Chaptal, 1756–1831, French chemist and statesman.] About 25 species, natives of warm-temperate and tropical America. Type species: *Chaptalia tomentosa* Vent.

Leaves oblanceolate, repand-dentate or entire; head not nodding.
Leaves lyrate-pinnatifid; head nodding.

1. *C. dentata*.
2. *C. nutans*.

1. **Chaptalia dentata** (L.) Cass. Dict. Sci. Nat. 26: 104. 1823.

Tussilago dentata L. Sp. Pl. ed. 2, 1213. 1763.

Tussilago albicans Sw. Fl. Ind. Occ. 3: 1348. 1806.

Chaptalia albicans Northrop, Mem. Torr. Club 12: 73. 1902.

Leaves oblanceolate or oblong-oblanceolate, 2–20 cm. long, repand-dentate or entire, obtuse or acute at the apex, long-attenuate at the base, loosely floccose or becoming glabrous and bright green above, densely white-felted or grayish-felted beneath, the petioles very short or sometimes as long as the blades; scape slender, more or less floccose, 1–3 dm. tall; head not nodding; involucre 13–22 mm. high, its linear bracts floccose, acuminate, the outer much shorter than the inner; flowers white (?); achenes glabrous or pubescent, the body 5–6 mm. long, the filiform beak longer; pappus straw-color, 8–10 mm. long.

Grassy hillsides and banks at lower elevations, southwestern and western districts of Porto Rico:—Bahamas; Jamaica; Cuba; Hispaniola. Recorded by Krebs from St. Thomas.

2. **Chaptalia nutans** (L.) Polak. Linnaea 41: 582. 1877.

Tussilago nutans L. Syst. ed. 10, 1214. 1759.

Chaptalia subcordata Greene, Leaflets, 1: 195. 1906.

Leaves lyrate, 8–30 cm. long, slightly floccose but becoming glabrate and dull green above, densely whitish-floccose beneath, the terminal lobe large, often half

the length of the leaf, obtuse, repand or subentire, the lower lobes few and small, or the petiole merely broadly margined; scape rather stout, floccose, 3–7 dm. high; head nodding, involucre 2–2.5 cm. high, linear-lanceolate, acuminate, floccose, the outer much shorter than the inner; flowers purple; achenes about 5 mm. long, glabrate or glandular, the filiform beak 2–3 times as long; pappus straw-color, 10–13 mm. long.

Banks and hillsides, Porto Rico, in moist regions, ascending into the Luquillo Mountains; St. Croix; St. Thomas; St. Jan; Tortola;—Jamaica; Cuba; Hispaniola; Saba to Trinidad; continental tropical America. BRETONICA.

Calendula officinalis L., POT MARIGOLD, European, occasionally grown in Porto Rico and Virgin Island flower gardens, is a pubescent branched annual, the leaves oblong or lanceolate, sessile, clasping, entire, the peduncled heads with an involucre of narrow bracts in one series or two, the yellow or orange rays about 2 cm. long, the rough incurved achenes without pappus.

Cynara Scolymus L., ALCACHOFA, ARTICHOKE, occasionally planted for food in Porto Rico, is a stout perennial, 1–2 m. high, with large pinnatifid leaves and large heads of purple tubular flowers, the fleshy involucre-bracts edible.

Callistephus chinensis Cass., CHINA ASTER, Asiatic, grown in Porto Rico flower-gardens, is a pubescent erect annual, 3–8 dm. high, with alternate lobed or dissected leaves and large heads of white, rose to purple ray-flowers, the tubular disk-flowers yellow, the outer involucre-bracts reflexed.

Matricaria Parthenium L., FEVERFEW, European, grown in Porto Rico mountain gardens, is perennial, 3–7 dm. high, with dissected leaves and numerous corymbose heads of radiate and discoid flowers, the rays white, the pappus a short dentate crown.

Aster versicolor Willd., VIUDA, VIOLETTA, grown for ornament in Porto Rico gardens, is perennial, 2–5 dm. high, with smooth oblong-lanceolate serrate leaves, the large heads of flowers corymbose-paniculate, the violet rays about 2.5 cm. long. It is presumably of North American origin, but is not certainly known in the wild state, having been grown in European gardens, perhaps derived from *Aster laevis* L.

Anthemis nobilis L., CAMOMILLA, CHAMOMILE, European, experimentally grown at the Trujillo Plant Propagation Station in 1925, is a low perennial, with finely dissected leaves, and slender-peduncled heads, the disk-flowers yellow, the rays white.

Tarchonanthus camphoratus L., of South Africa, recorded by Eggers as formerly cultivated on St. Croix, is a resinous shrub, with alternate oblong leaves tomentose beneath, the heads in terminal panicles, dioecious.

Helichrysum bracteatum (Vent.) Willd., STRAW FLOWER, Australian, occasionally grown in Porto Rico flower gardens, is a glabrous annual, 6–9 dm. high, the oblong-lanceolate, entire leaves 7–12 cm. long, the large heads of yellow flowers with many lanceolate shining bracts 10–16 mm. long, white, yellow or red. [*Xeranthemum bracteatum* Willd.]

Chrysogonum dichotomum Vahl, of St. Croix, is unknown to modern botanists.

Coreopsis tinctoria Nutt. [*Calliopsis bicolor* Rchb.], North American occasionally grown in Porto Rico and Virgin Island flower-gardens, is annual, with dissected leaves and long-peduncled heads, the ray-flowers yellow with a brown base, the thin achenes without pappus.

Coreopsis lanceolata L., North American, occasionally grown in Porto Rico flower-gardens, is a low perennial, with entire or few-lobed oblong or spatulate leaves 5–15 cm. long, and long-peduncled heads, the rays bright yellow, cuneate, 3–7-lobed, the pappus of 2 short teeth.

Dahlia pinnata Cav., DAHLIA, Mexicana. Cultivated races are occasionally grown in Porto Rico and Virgin Island flower-gardens and succeed well at middle and higher elevations. [*Georgina variabilis* Willd.]

Montanoa hibiscifolia (Benth.) C. Koch, Guatemalan, planted at the Trujillo Plant Propagation Station in 1924, was 5 m. high and luxuriant in March 1926. It has broad 5–7-lobed leaves, the heads in terminal panicles, with white rays about 2 cm. long. [*Montagnaea hibiscifolia* Benth.]

Solidago sempervirens L., Seaside Goldenrod, North American, herbaceous, about 1 m. high, with oblong or oblong-lanceolate entire and fleshy leaves and many small paniced heads of yellow flowers, appeared luxuriant at the Trujillo Plant Propagation Station in 1925.

Helenium tenuifolium Nutt., North American, recorded by Urban as grown in a garden near Yabucoa, Porto Rico, is a nearly glabrous annual about 1 m. high or less with nearly or quite entire linear leaves 2–12 cm. long, the heads with few yellow rays, 10–15 mm. long, the truncate achenes with ovate, slender-tipped pappus scales.

Chrysanthemum morifolium Ram., VIUDA, CHRYSANTHEMUM, Asiatic, of horticultural origin, often grown in several races in Porto Rico and Virgin Island flower-gardens, is an erect perennial, up to about 2 m. high or lower, with ovate lobed leaves, the flower-heads extremely various, the rays of many different colors; *Chrysanthemum indicum* L. is supposed to be one of the parents.

Helianthus annuus L., SUNFLOWER, North American, grown in Porto Rico and Virgin Island gardens, is a tall rough annual 1–3 m. high, the stem stout, the mostly alternate broad leaves dentate, the lower ones cordate, the nodding heads with acuminate involucre-bracts, the yellow rays 3–6 cm. long, the disk-flowers purple, the edible achenes flat. [(?) *Helianthus multiflorus* of Krebs.]

Helianthus cucumerifolius T. & G., Texan, grown for ornament in Mrs. Maxwell's garden at Ensenada, Porto Rico, resembles *H. annuus*, but is smaller, with mottled slender stems about 1 m. high or less, the yellow rays 2–3 cm. long.

Helianthus tuberosus L., JERUSALEM ARTICHOKE, GIRASOLE, North American, grown in several races in Porto Rico for its edible tubers, is perennial, 3 m. high or lower, with ovate scabrous leaves, the flower-heads 6–8 cm. broad, the rays and disk-flowers yellow.

Achillea Millefolium L., YARROW, MILFOIL, PERLA, European, grown in mountain flower-gardens in Porto Rico, and seen also in Mrs. Barcelo's garden at Condado, near sea-level, is an herbaceous perennial, 3–6 dm. high, with finely dissected leaves and small corymbose heads of bright white flowers 8–10 mm. broad.

Artemisia Absinthium L., WORMWOOD, ABSINTH, European, grown in 1926 at the Trujillo Plant Propagation Station, is shrubby, about 1 m. high, with 1–3 pinnately divided silky-silvery leaves, the small heads of yellowish flowers racemose-paniculate.

Centaurea Cyanus L., CORN-FLOWER, European, occasionally grown in Porto Rico flower gardens, is annual, 3-6 dm. high, with linear stem-leaves, the heads of tubular-flowers purple to white, the marginal flowers enlarged, resembling ligules.

Rudbeckia bicolor Nutt., Cone-flower, North American, was experimentally grown from seed at the Insular Experiment Station, Rio Piedras, in 1925.

Class 2. GYMNOSPERMAE.

Ovules (macrosporanges) naked, not enclosed in an ovary, this represented by a scale or apparently wanting. Pollen-grains (microspores) dividing at maturity into two or more cells, one of which gives rise to the pollen-tube (male prothallium), which directly fertilizes an archegone of the nutritive endosperm, (female prothallium) in the ovule.

The Gymnosperms are an ancient group, first known in Silurian time. They became most numerous in the Triassic age. They are now represented by not more than 450 species of trees and shrubs.

There are four orders, Pinales, Cycadales, Ginkgoales, and Gnetales, the two first represented in this Flora.

Leaves scale-like, linear, lanceolate or needle-like.
Leaves large, pinnate, in a terminal crown.

Order 1. PINALES.
Order 2. CYCADALES.

Order 1. PINALES.

Trees, or rarely shrubs, growing from both terminal and lateral buds, thus freely branching, the trunks mostly excurrent. Leaves scale-like, linear, lanceolate or needle-like, sometimes fascicled. Flowers mostly monoecious. Fruit a cone, with woody or fleshy scales, or drupaceous.

Family 1. TAXACEAE Lindl.

YEW FAMILY

Monoecious or dioecious evergreen trees or shrubs, often destitute of resin. Leaves linear or lanceolate, occasionally scale-like. Staminate flowers in more or less crowded cylindric or spherical aments, often solitary in the axils of the leaves, occasionally clustered or terminal; pollen sacs opening longitudinally. Pistillate flowers often solitary. Ovules usually solitary erect or inverted, sessile or stipitate. Seed drupe-like, naked or with a pulpy aril, sometimes borne on a fleshy receptacle. Seed-coat woody or bony. Endosperm fleshy or mealy. Cotyledons 2. About 10 genera and 100 species of wide geographic distribution, most numerous in the southern hemisphere.

1. NAGEIA Gaertn. Fruct. & Sem. 1: 191. 1788.

[PODOCARPUS L'Her. Obs. Phys. 38: 6. 1791.]

Evergreen trees or shrubs, with alternate or opposite coriaceous leaves. Flowers dioecious or rarely monoecious, the staminate inflorescence catkin-like,

axillary; anthers spirally arranged, 2-celled; with pistillate inflorescence consisting of a scale inclosing the ovule, with several bracts at the base, which usually become swollen at maturity, and forms a fleshy receptacle upon which the globose or ovoid drupe-like seed is borne; testa hard, often fleshy without; endosperm fleshy. [From Nagi, the Japanese name.] About 60 species, natives mostly in the mountains of tropical and subtropical South America; the West Indies; Asia; Africa; and Australia. Type species: *Nageia japonica* Gaertn.

1. ***Nageia coriacea*** (L. C. Rich.) Kuntze, Rev. Gen. 800. 1891.

Podocarpus coriaceus L. C. Rich. Ann. Mus. Paris **16**: 297, hyponym 1810: Comm. Bot. Conif. 14. 1826.

Podocarpus salicifolius Klotz & Karst.; Endl. Syn. Conif. 209. 1847.

A forest tree sometimes 20 m. tall, with more or less spreading branches. Leaves lanceolate, occasionally somewhat falcate, 6–13 cm. long, 9–15 mm. broad, sometimes larger on the young shoots, acute to long-acuminate at the apex, acute at the base, short-petioled; staminate aments cylindric, slender, 3–5 cm. long; pistillate inflorescence solitary, axillary; mature peduncles slender, 7–13 mm. long; fleshy receptacle 6–7 mm. long; seed ellipsoid or ellipsoid-ovoid, 9–11 mm. long, 6–7 mm. in diameter.

Mountain forests and wooded valleys, western Porto Rico:—St. Kitts; Montserrat; Guadeloupe; Dominica; Martinique; Trinidad; also in northern South America.

Nageia elata (R. Br.) F. Muell, Australian, grown from seed at Louisenhøj, St. Thomas in 1925, is an Australian tree, with lanceolate acuminate leaves.

The Family **PINACEAE** is not represented by any native or naturalized species; the following are, or have been, planted:—

Pinus caribaea Morelet, CARIBBEAN PINE-TREE, native of the southeastern United States, the Bahamas and Cuba, experimentally introduced by seed, for forestry in Porto Rico, reaches in its native habitats a height of about 30 m., with a trunk up to 1.5 m. in diameter with thick bark splitting into irregular plates, the strong, hard wood with a specific gravity of about 0.75, coarse-grained, durable, much used for crates and boxes. Its needle-like leaves are in clusters of 2 or 3, dark green, 17–30 cm. long, their sheaths 1–1.5 cm. long; its cones are conic, 9–14 cm. long, their scales rounded and thickened into a low knob which bears a small, short spine. From its natural distribution, this pine would appear to be the most likely one to succeed at lower elevations in Porto Rico.

Pinus occidentalis Sw., of the mountains of Hispaniola, is a very large tree, recorded as reaching 66 m. in height. Its leaves are in clusters of 3 to 5, 12–18 cm. long, their sheaths short; the cones are oblong-conic, 5–6 cm. long, their small scales bearing a triangular mucronate umbo. A young plant was brought from Santo Domingo to the Forest Station at Rio Piedras, by Commissioner Chardon in 1924. From the distribution of the species, at altitudes from about 500 to 2500 meters in Hispaniola, it may be expected to be suitable for mountain plantations in Porto Rico.

Pinus canariensis C. Smith, CANARY ISLAND PINE, grown experimentally from seed at the Forest Station, Rio Piedras, Porto Rico, has very slender drooping leaves 3 in each fascicle, pale green; its cones are ovoid-cylindric, 1–2 dm. long.

Other pines experimentally grown from seed for forest purposes in Porto Rico include:

Pinus palustris Mill., LONG-LEAVED Pine, North American.

Pinus Taeda L., LOBLOLLY PINE, North American.

Pinus echinata Mill., YELLOW PINE, North American.

Pinus maritima Mill., MARITIME PINE, of southern Europe.

Pinus radiata Don. (*P. insignis* Dougl.), MONTEREY PINE, California.

Pinus muricata Don., California.

Pinus halepensis Mill., ALEPPO PINE, of the Mediterranean region.

Pinus Pinea L., STONE PINE of northern Europe.

Pinus Montezumae Lamb., MONTEZUMA PINE, Mexican.

Pinus cembroides Zucc., MEXICAN STONE PINE, Mexican.

Pinus patula Schiede & Deppe, GELECOTI PINE, Mexican.

None of these seemed likely to succeed except, possibly, *P. maritima* and *P. Pinea*.

Two trees of an undetermined species of *Pinus* a number of years old, but only about 1.5 m. high, evidently not suited to the climate, were seen at Villa Leon near Bayamon, Porto Rico in 1925. Their foliage resembles that of *Pinus insularis* Endl., of the Philippine Islands.

Araucaria excelsa R. Br., NORFOLK ISLAND PINE, commonly planted for ornament in Porto Rico, and occasionally in the Virgin Islands, is a tall tree with rather short verticillate branches, the imbricated subulate leaves about 2 cm. long; its globose cones are 10–15 cm. in diameter.

Araucaria Bidwillii Hook., BUNGA-BUNGA, Australian, was seen as young plants 3 dm. high at the Forest Station, Rio Piedras in 1925. It is a very tall tree, its stiff lanceolate spinulose-tipped leaves 2–4 cm. long, its large cones ovoid.

Araucaria brasiliana A. Rich., Brazilian, also grown from seed at the Rio Piedras Station in the Spring of 1925, reached a height of over 3 dm. by the end of that year, appearing sturdy and promising. It forms a tree up to 50 m. high, with stiff lanceolate spinulose-tipped leaves 3 or 4 cm. long.

Taxodium distichum (L.) L. C. Rich., BALD CYPRESS, of the southeastern United States, was grown from seed at the Forest Station at Rio Piedras, Porto Rico, in 1922, but only one plant survived. This large deciduous-leaved tree inhabits swamps and river-banks; it is not likely to endure the continuously warm climate of Porto Rico. [*Cupressus disticha* L.]

Taxodium mucronatum Tenore, ARBOL DE LA NOCHE TRISTE, Mexican, grown from seed in 1923 at the Insular Agricultural Experiment Station, Rio Piedras, was growing there vigorously in March 1924, having reached about 1.5 meters in height. It has also been grown at the Forest Station, Rio Piedras. The introduction of this evergreen species is of especial interest and possible importance.

Cupressus arizonica Greene, ARIZONA CYPRESS, experimentally grown from seed at the Rio Piedras Forest Station, is native of Arizona and northern Mexico. It has pale green evergreen minute leaves imbricated on slender twigs and subglobose cones about 2 cm. long, the 6 or 8 woody scales tipped with stout short projections.

Cupressus macrocarpa Hartweg, MONTEREY CYPRESS, Californian, grown from seed at the same station in the spring of 1925, had reached a height of nearly 3 dm. by December of that year. It resembles *C. arizonica*, but with darker green leaves and larger cones.

Cupressus Benthami Endl., BENTHAM'S CYPRESS, Mexican, seeds of which were also germinated at the Rio Piedras Station in the spring of 1925, was quite

3 dm. high in December, 1925, and appeared thrifty. It has smaller leaves and cones than the preceding species, and is often regarded as a variety of the following one.

Cupressus lusitanica Mill., PORTUGUESE CYPRESS, also Mexican in origin, and also grown from seed at the Rio Piedras Station, is a tree up to about 16 m. high, with glaucous foliage and cones about 1.2 cm. in diameter.

Cupressus sempervirens L., CYPRESS, European, grown from seed at Louisenhöj, St. Thomas, in 1924, had reached a height of 3 dm. in March 1925. Seedlings of about the same height were seen also at the Forest Station, Rio Piedras, in 1926.

Cupressus funebris Endl., Chinese, introduced in 1925 at the Mayaguez Experiment Station was about 6 dm. high in March, 1926. This forms a tree 15-20 m. high, with flattened pendulous branchlets, the globose cones about 1 cm. in diameter.

Heyderia decurrens (Torrey) K. Koch, INCENSE CEDAR, of Oregon and California, experimentally grown at the Rio Piedras Forest Station, has scale-like leaves on slender twigs and cones about 2 cm. long, composed of 3 pairs of opposite scales. The climate is too continuously warm for its development. [*Libocedrus decurrens* Torr.]

Cryptomeria japonica D. Don., JAPANESE CEDAR also experimentally grown at the Rio Piedras Station, forms a large pyramidal tree, with whorled branches, the linear leaves spirally arranged, the globose cones 2 cm. in diameter. Seedlings had reached about 1 m. in height in the spring of 1926, and appeared vigorous at the Forest Station.

Chamaecyparis pisifera Sieb. & Zucc., Japanese, or a related species, occasionally planted for ornament in Porto Rico, is a tree, with small opposite subulate leaves; we have not seen fruit on trees in Porto Rico, and the determination is, therefore, doubtful.

Callitris verrucosa R. Br., Australian, grown at the Forest Station, Rio Piedras, Porto Rico, is a highly ornamental evergreen, the young plants with nearly white bark marked with oblong scars; the whorled leaves are small and scale-like. Its cones become about 2 cm. in diameter.

* A small tree of one of the North American species of **Picea**, Spruce, planted in a yard at Santurce, Porto Rico, after use as a Christmas tree in December 1923, had made young growth 6-12 cm. long by March 1924, but succumbed.

Thuja orientalis L., ASIATIC ARBOR-VITAE, Asiatic, planted for ornament in Porto Rico and the Virgin Islands, becomes under favorable conditions a tree up to 8 m. high; its flattened twigs bear many imbricated, ovate, scale-like leaves about 3 mm. long; its ovoid cones, composed of about 6 ovate, horned scales, are about 18 mm. long. [*Biota orientalis* Endl.; *Thuja occidentalis* of Cook and Collins, not of Linnaeus.]

Juniperus bermudiana L., BERMUDA RED CEDAR, Bermudian, recorded by Eggers as planted on St. Croix, prior to 1876, reaches, in Bermuda, a height of about 22 m. with a trunk up to 1.3 m. in diameter, the thin gray bark separating in long narrow strips, its soft red wood highly valued for furniture, posts and a great variety of small objects; the leaves of young plants are acicular, 4-10 mm. long, those of older plants scale-like, about 2 mm. long, appressed and imbricated;

its blue fruits are berry-like, depressed globose, about 8 mm. broad, composed of a few fleshy scales.

Juniperus procera Hochst., South African, recently introduced at the Agricultural Experiment Station, Mayaguez, was about 1.5 m. high and vigorous in March, 1926.

A species of **Juniperus**, introduced from Florida at the Forest Station, Rio Piedras in 1924 had reached a height of 3 dm. in March, 1925.

Order 2. CYCADALES.

Palm-like or fern-like, dioecious woody plants, with erect trunks, sometimes short and wholly buried in the ground, growing only from the summit and thus unbranched, although sometimes forming lateral adventitious buds, the large pinnate leaves in a terminal crown. Flowers in terminal cones, or on modified leaves. Scales of the staminate cones bearing several anthers. Ovule-bearing scales or leaves with two or more naked ovules. Seeds drupe-like or nut-like. Only the following family.

Family 1. CYCADACEAE Lindl.

CYCAD FAMILY

Nine genera and about 90 species, of tropical and subtropical distribution.

1. **ZAMIA** L. Sp. Pl. ed. 2, 1659. 1763.

Woody dioecious plants, the trunk or caudex wholly or partly buried in the ground, the palm-like leaves tufted at its summit, pinnately compound, coriaceous, the segments entire or toothed, parallel-veined, the petioles unarmed in the following species, often channeled above, prickly in some others, the inflorescence strobilar, peduncled, densely many-flowered, the cones from oblong-cylindric to subglobose, the female thicker than the male, beaked. Scales of the cones peltate, nearly flat, more or less hexagonal, closely set together, vertically superimposed. Scales of the male cone at length deciduous, bearing several sessile pollen-sacs, those of the female cone persistent, bearing 2 sessile, ovoid ovules. Seeds more or less angled, the testa fleshy. [Said to be Latin for a fir-cone.] About 25 species, natives of tropical and warm-temperate America. Type species: *Zamia pumila* L. The plants are known in Porto Rico as MARANGUEY; the caudex contains much starch.

Leaflets linear or obovate, 0.7–5 cm. wide.

Leaflets oblong to oblanceolate, 1.5–5 cm. wide, the apex usually oblique and eroded.

Leaflets linear, 7–15 mm. wide, the apex few-toothed.

Leaflets narrowly linear, 4–7 mm. wide, the apex narrowed to a blunt tip.

1. *Z. latifoliolata*.

2. *Z. media*.

3. *Z. portoricensis*.

1. **Zamia latifoliolata** Preneloup, Bull. Soc. Vaud. Sci. Nat. 11: 278. 1872.

Zamia erosa Cook & Collins, Contr. U. S. Nat. Mus. 8: 267. 1903.

Caudex stout, up to 4 dm. long or longer. Leaves 6–10 dm. long; leaflets 10–36, oblanceolate or oblong-oblanceolate, 8–20 cm. long, 1.5–5 cm. wide, or those of some leaves narrower, sparingly toothed near the apex, or entire, many-nerved, smooth, shining, opposite or alternate, the apex usually oblique and erose; staminate cones cylindric, 6–9 cm. long their scales tomentulose, the tomentose

peduncle 2–8 cm. long; fruiting pistillate cones subcylindric, 8–12 cm. long, 4–6 cm. in diameter, their brown-tomentose scales 10–12 mm. high, about 2 cm. broad, the sharp conic tip about 2 cm. long; seeds obtusely angled, 1.5–2 cm. long. [*Z. integrifolia* of Jacquin, of Bello and of Urban, not of Aiton; *Palmifolium integrifolium* of Kuntze.]

Wooded limestone hills and thickets, northern districts of Porto Rico, and occasionally planted for ornament in gardens:—Jamaica; Cuba; Hispaniola.

2. ***Zamia media*** Jacq. Hort. Schoenb 3: pls. 397, 398. 1798.

Palmifolium medium Kuntze, Rev. Gen. Pl. 803. 1891.

Caudex stout, up to 3 dm. long or longer. Leaves 5–10 dm. long; leaflets about 20 to 40, narrowly lanceolate or linear-lanceolate, 8–20 cm. long, 7–15 mm. wide, sparingly toothed toward the obtuse apex or entire, 12–25-nerved, alternate or opposite, smooth, rather dull; staminate cones cylindric, 5–6 cm. long, their scales tomentose, the tomentose peduncle 2–3 cm. long or shorter; fruiting pistillate cones subcylindric, 8–12 cm. long, 3–4 cm. in diameter, their tomentose scales about 9 mm. high and 15 mm. broad, the tip conic, the peduncle 4–6 cm. long.

Hillside and arroyos in southern districts of Porto Rico:—Cuba; Hispaniola. A fine specimen was observed in a garden on St. Thomas in 1924.

3. ***Zamia portoricensis*** Urban, Symb. Ant. 1: 291. 1899.

Caudex 3–4 dm. long, sometimes irregularly constructed. Leaves 3–8 dm. long; leaflets 20–34, linear or narrowly linear-lanceolate, 6–18 cm. long, 4–7 mm. wide, narrowed to the obtuse apex, entire, or rarely with 1 or 2 small teeth near the tip, 9–13-nerved, opposite or alternate, smooth, shining; staminate cones cylindric, rounded, about 5 cm. long, their scales tomentose, the peduncle 2–3 cm. long; fruiting pistillate cones oblong-cylindric, about 10 cm. long or shorter, 4–5 cm. in diameter, their gray-tomentose scales 8–12 mm. high, about 2 cm. broad, the conic tip 1–1.5 cm. long, the tomentose peduncle 3–4 cm. long. [? *Z. angustifolia* of Bello, not of Jacquin.]

Woodlands and thickets, dry southwestern districts of Porto Rico. Endemic.

This plant is reported by residents of the region it inhabits, to cause cattle eating its leaves to be subject to a serious disease known as ranilla. Except for the relative width of leaflets, the three species of *Zamia* inhabiting Porto Rico are much alike, and perhaps, confluent.

Cycas revoluta Thunb., ALCAMFOR, SAGO PALM, Asiatic, often planted for ornament in Porto Rico and the Virgin Islands, has a rough cylindric trunk up to about 2 m. high and nearly 3 dm. in diameter, topped by a crown of dark green, stiff, pinnate leaves 1–2 m. long, with many nearly linear leaflets, their margins revolute; the flowers are in large clusters, which alternate with a crown of leaves.

Cycas circinalis L., of tropical Africa, occasionally planted in Porto Rico and Virgin Island gardens, has a trunk 2–4 m. high, the large pinnate leaves similar to those of *C. revoluta*, but the leaflets are flat and not as rigid.

APPENDIX TO SPERMATOPHYTA

During the publication of the Descriptive Flora, Spermatophyta (Volume V, parts 1–4; volume VI, parts 1, 2 and 3), from August 1923 to June 1926, Dr. Britton and Mrs. Britton have made three additional visits to Porto Rico and the Virgin Islands (January to March, 1924, with Dr. Fred J. Seaver; January to April, 1925, with

Mr. Kenneth R. Boynton; January to March, 1926, with Dr. Arthur Hollick). During these periods collections were obtained and observations made. Correspondents have also contributed notes and specimens. Officers of the Department of Agriculture and Labor of Porto Rico, and of the Federal Agricultural Experiment Stations in Porto Rico and in St. Croix, and other persons interested in plants have been assiduous in introducing many economic species and ornamentals into nurseries and gardens; a large number of these have been studied; in general, species which have not succeeded or have been lost, have not been recorded. An ecological survey of Porto Rico was accomplished by Dr. H. A. Gleason of the New York Botanical Garden and Dr. Mel T. Cook, botanist of the Porto Rico Department of Agriculture and Labor, from January to April, 1926. They travelled widely over the island and made a large collection of specimens.

The information thus obtained is here brought together, as well as some derived from further study of earlier collections.

Vol. V, p. 9, add **Pandanus pacificus** Bailey, occasionally planted in gardens of Porto Rico, has stiff, bright green and lustrous leaves up to about 2 m. long and 15 cm. wide, their margins and midrib armed with short prickles, the tip abruptly long-acuminate.

Pandanus tectorius Schrad., East Indian and Australasian, established at the Mayaguez Experiment Station, introduced in 1924, has linear-lanceolate leaves 1-1.5 m. long, 2-5 cm. wide, long-acuminate.

Vol. V, p. 24, **Schizachyrium gracile**, add locality, rocky hillside, Collazo River, near San Sebastian, Porto Rico.

Vol. V, p. 25, **Schizachyrium semiberbe**, add to distribution, St. Croix.

Vol. V, p. 26, **Andropogon bicornis**, add to distribution, St. Croix.

Vol. V, p. 28, **Cymbopogon Nardus**, add to distribution, St. Croix.

Cymbopogon citratus, add to distribution, St. Croix.

Vol. V, p. 29, **Holcus Sorghum**, add common name, SHALLU.

Vol. V, p. 37, **Paspalum paniculatum**, add to distribution, St. Croix.

Vol. V, p. 41, add **Paspalum dilatatum** Poir., DALLIS GRASS, has been experimentally grown in Porto Rico as a forage grass. It is a tall species, with rather large spikelets.

Vol. V, p. 43, **Panicum geminatum**, add to distribution, Vieques.

Vol. V, p. 44, **Panicum reptans**, add St. Croix common name, TEN-PERCENT GRASS.

Vol. V, p. 53, **Echinochloa colonum**, add St. Croix common name, CRUCIFIX GRASS.

Oplismenus hirtellus, add note, ascends to the higher elevations on Tres Picachos, Porto Rico, (*E. E. Dale*, 1926).

Vol. V, p. 56, add **Chaetochloa italica** (L.) Scribn., ITALIAN MILLET, European, was cultivated at the Agricultural Experiment Station, St. Croix and also at the Trujillo Plant Propagation Station. It is 1.5 m. high or less, the leaves broad, the inflorescence purplish, dense, 1-2 dm. long. [*Panicum italicum*, L.]

Vol. V, p. 57, add **Pennisetum clandestinum** Choiv., KIKUYU GRASS, was experimentally grown as a forage grass at the Insular Experiment Station, Rio Piedras, in 1924, and elsewhere in Porto Rico in 1925. It is a low spreading grass, native of Africa, perhaps Abyssinian.

Pennisetum glaucum (L.) R. Br., [*Panicum glaucum* L.] was grown at the Agricultural Experiment Station, St. Croix in 1924. It is a tall grass, with long leaves 2-3 cm. wide, the very dense spicate inflorescence 1-3 dm. long.

Pennisetum orientale Rich., cultivated by Mr. A. S. Fairchild at Louisenhøj, St. Thomas, is a tall perennial grass, with narrow leaves and a long thick panicle, the bristles plumose.

Vol. V, p. 58, **Cenchrus carolinianus**, for this name substitute **Cenchrus pauciflorus** Benth. Voy. Sulph. 56. 1840 (See Hitchcock and Chase, Contr. U. S. Nat. Herb. 22: 67).

Vol. V, p. 59, **Lithachne pauciflora**, add to distribution, St. Croix.

Vol. V, p. 64, **Sporobolus murâlis**, add to distribution, cultivated ground, Louisenhøj, St. Thomas, 1925.

Vol. V, p. 67, **Chloris paraguayensis**, add St. Croix common name, MEXICAN BLUE-GRASS.

Vol. V, p. 68, **Gymnopogon foliosus**, add to distribution, abundant near Laguna Rica, Porto Rico, 1924. Repeated recent search for this grass on St. Thomas, the type locality, has failed to find it there.

Vol. V, p. 71, **Leptochloa filiformis**, add note, collected on St. Croix by Thompson in 1924, under common name ARROW-GRASS.

Vol. V, p. 72, **Diplachne fascicularis**, add to distribution Grange Gut, St. Croix.

Vol. 5, p. 75, add 5a, **Eragrostis glutinosa** (Sw.) Trin. Mem. Acad. St. Petersb. VI. Math. Phys. Nat. 1: 397, 1830.

Poa glutinosa Sw. Prodr. 26. 1788.

Perennial, tufted, the culms slender, 1-3 dm. tall, wiry; blades nearly equaling the small open panicles, the branches viscid; spikelets linear, 5-8 mm. long.

Anna's Hope, St. Croix:—Cuba; Jamaica.

Eragrostis amabilis, add to distribution, St. Croix.

Vol. V, p. 76, **Arthrostyloidium capillifolium**, add to distribution, Dominiguito, near Arecibo (*H. T. Cowles 1166*, collected February, 1926).

Vol. V, p. 77, add **Bambos nana** Roxb., East Indian, occasionally planted for ornament and luxuriant in Porto Rico, is the species referred to on that page as the low arching bamboo seen at the Mayaguez Experiment Station. It forms large clumps 2-3 m. high, its leaves about 6 cm. long.

Bambos polymorpha Munro, East Indian, was planted at the Forest Station, Rio Piedras in 1925. This is a timber bamboo, attaining 20-25 m. in height, with a trunk diameter of about 1.5 dm., its linear-lanceolate leaves 1-1.5 dm. long.

Dendrocalamus strictus Nees, East Indian, was experimentally planted at the Insular Experiment Station, Rio Piedras, in 1923. This is a tall bamboo, up to 15 m. high, its culms nearly or quite solid.

Phyllostachys aurea Riv., Asiatic, was planted at the Rio Piedras Station in 1923. Its yellow stems become 3-5 m. long, its acuminate leaves 5-15 cm. long.

Arundinaria falcata Nees, native of the Himalayas, was also planted at the Rio Piedras Station in 1923. Its very slender culms reach a height of about 6 m.; the sheaths of its lanceolate serrulate leaves are ciliate.

Vol. V, p. 78, at end of Poaceae, add **Miscanthus sinensis** Anderss., JAPANESE PLUME-GRASS, a tall grass, often with striped or banded leaves, was grown at the Trujillo Plant Propagation Station in 1925. [*Eulalia japonica* Thunb.]

Triticum aestivum L. (*T. vulgare* Vill.), Wheat, recorded as formerly grown in Porto Rico, does not succeed in tropical climates.

Vol. V, p. 88, under **Cyperus filiformis**, add note, interesting planting of this sedge as a ground-cover, in partial shade, by Mr. A. S. Fairchild, at Louisenhøj, St. Thomas, was observed in 1925.

Vol. V, p. 90, **Eleocharis cellulosa**, add to distribution, St. Croix.

Vol. V, p. 91, **Eleocharis atropurpurea** add note, recent collections indicate that the plant of Porto Rico, referred to that species, is distinct, and had better bear the name **Eleocharis Sintenisii** Boeckl.

Vol. V, p. 92, **Eleocharis nodulosa**, add to distribution, small marsh near Aibonito, on Barranquitas Road east of Military Road, Porto Rico, 1925. (*Britton and Boynton 8252*.)

Vol. V, p. 92, **Eleocharis geniculata**, add note, culms up to 2.5 m. long were observed along a brook in a ravine near Cidra, Porto Rico.

Vol. V, p. 96, **Abildgaardia monostachya**, add to distribution, St. Croix.

Vol. V, p. 97, **Scirpus Olneyi**, add localities, swamps east of Arecibo and at Cambalache, (*Gleason and Cook, F 7, 1926*).

Vol. V, p. 103, **Rynchospora Bruneri**, read Britton, not Britten.

Vol. V, p. 115, **Cocos nucifera**, in note read Ensenada, not Ensendada.

Vol. V, p. 116, **Sabal texanum** (O. F. Cook) Beccari, TEXAS PALMETTO, was added to the collection of the Agricultural Experiment Station, Mayaguez in 1918, but had made very slow growth up to the spring of 1926. [*Inodes texana* O. F. Cook.]

Vol. V, p. 117, add, **Thrinax parviflora** Sw., a fine specimen of which was seen in Miss Manecke's Garden, St. Thomas, in 1925, is a slender palm, with leaves 1-2 m. broad, the bright white fruits slender-pedicelled, 8-10 mm. in diameter, borne in long drooping panicles; it is a native of Florida, Jamaica and Cuba.

Vol. V, p. 118, under **Phoenix canariensis**, add note, grown also from seed at the Forest Station Rio Piedras, in 1925.

Vol. V, p. 118 add **Phoenix Ouseleyana** Griff., East Indian, was seen as young plants at the Forest Station and at the Insular Experiment Station, Rio Piedras, in 1926, and grown also at the Mayaguez Station. [*P. humilis* Royle.]

Phoenix Roebelinii O'Brien, East Indian, occasionally seen in Porto Rico gardens, and extensively grown by Mr. F. M. Pennock at his nursery in Sabana Llana for its seed for export, is a low highly ornamental palm, about 2 m. high or less, the pinnate leaves with linear flaccid segments.

Vol. V, p. 118, add **Latania Loddigesii** Mart., native of Mauritius, fine plants of which were studied in Mrs. McKinley's garden near Santurce in 1924 and 1925, has a very stout trunk and stiff, palmately divided, pale short-petioled leaves, with short and broad scurfy petioles, the oval fruits about 7 cm. in diameter.

Vol. V, p. 119, add **Bentinckia nicobarica** Beccari, of the Nicobar Islands, was seen as seedlings at the Trujillo Plant Propagation Station in 1925.

Vol. V, p. 119, for **Licuola** read **Licuala**.

Chrysalidocarpus lutescens, add, grown also in Virgin Island gardens.

Pritchardia pacifica, add, also grown for ornament in the Virgin Islands.

Vol. V, p. 120 add **Hyophorbe amaricaulis** Mart., native of Mauritius, seen at Miss Manecke's garden, St. Thomas, in 1925, has a stout trunk 2-3 m. high, swollen at the base, the many narrow segments of the pinnate leaves strongly veined, the oval fruits about 2 cm. long.

Vol. V, p. 120, at end of Arecaceae, add **Raphia pedunculata** (Lam.) Beauv., Madagascan, grown from seed at the Mayaguez Experiment Station in 1921 had formed leaves about 1 m. long in 1926. Its leaves are described as becoming very large, up to about 20 m. long, pinnate, with narrowly lanceolate segments, the large obovoid fruits covered with retrorsely imbricated scales. [*Sagus pedunculata* Lam.]

Elais melanococca, Colombian, grown from seed of 1925 at the Mayaguez Experiment Station, was 3 dm. high in March 1926.

Rhapis flabelliformis, add, grown also in St. Thomas gardens.

Pinanga Kuhlii Blume, JAVA PALM, Malayan, experimentally grown at the Forest Station, Rio Piedras in 1925, is a slender pinnate-leaved palm, the leaves becoming 1 m. long or longer, with many narrow segments; the ovoid fruit is red, with a thin husk.

Guilielma utilis Oerst., PEJIBAYE, of Central America and northwestern South America, was seen as seedling plants in 1926 at the Forest Station, Rio Piedras, and at the Trujillo Plant Propagation Station and it was also recently added to the collection at the Mayaguez Experiment Station where vigorous plants 1.5 m. high were seen in 1926. It is a tall, densely spiny palm, the large leaves pinnate, the racemose small flowers monoecious, the turbinate or ovoid fruits 3-5 cm. long, the yellowish flesh mealy, edible.

Cyrtostachys Lakka Becc., grown from Penang seed at the Forest Station Rio Piedras, in 1925, is a slender pinnate-leaved palm native of Borneo.

Erythea armata S. Wats., of Lower California, grown from seed of 1925 at the Forest Station, Rio Piedras, was about 2 dm. high in February, 1926. It is a tall palm with flabelliform leaves, the petioles with hooked spines, the fruit berry-like.

Attalea gomphococca Mart., South American, grown at the Mayaguez Experiment Station from seed of 1925, was about 4 dm. high in March 1926.

Vol. V, p. 124, add **Philodendron Nechodomi** Britton, sp. nov.

Leaves 4-6 dm. long, spreading and slightly recurved, the petiole nearly one-half as long as the blade channeled above its entire length, convex below. Blade ovate in outline, glabrous, bright green and faintly blotched, shining on both sides, pinnately divided nearly or quite to the midrib, with a row of oblong white spots 2-3 m. long, some of which become perforations, along each side of it on the upper surface, the segments triangular-lanceolate, 8-12 cm. long, slightly curved upward, oblique and acuminate at the apex, the midvein prominent beneath, impressed above, the lateral venation delicate and obscure.

Garden of Mr. Antonin Nechodoma, Monteflores, Porto Rico, Feb. 28, 1925, reported by him as brought from Camp La Gloria, eastern slope of El Yunque, Luquillo Mountains of Porto Rico, at about 500 m. in 1922. The vine was about 2 m. long when studied at this time, climbing upon a young mango tree (*Britton and Boynton*, 8261, type). Endemic.

Vol. V, p. 129, add **Anthurium magnificum** Lindl., native of Colombia, seen in the rectory garden at St. Thomas in 1924, has rosulate cordate white-veined, ornamental leaves, long-peduncled lanceolate green spathes, the spadix violet.

Vol. V, p. 130, add **Alocasia macrorrhiza** (L.) Schott, PANAMA, East Indian, grown for ornament in Porto Rico, and locally abundant as an escape from cultivation in moist grounds, has a thick short caudex, very large, nearly erect leaves with the channeled petiole about as long as the ovate repand sagittate blade; we have been unable to find it flowering in Porto Rico, and are indebted to Mr. Otis W. Barrett for its identification [*Arum macrorrhizum* L.].

Scindapsus argyraea Engler, native of the Philippine Islands, a climbing aroid with ovate mottled leaves, was apparently established on shaded rocks at Luisenhøj, St. Thomas, in March, 1925, from a cutting sent from the New York Botanical Garden late in 1923.

Vol. V, p. 130, **Monstera deliciosa**, add, established in shade at Luisenhøj, St. Thomas, in 1925.

Zantedeschia aethiopica (L.) Spreng., **CALLA LILY**, African, occasional in Porto Rico gardens, has ovate-lanceolate, sagittate green leaves and white long-peduncled spathes, the spadix yellow. [*Calla aethiopica* L.]

Zantedeschia Elliottiana Engler, **GOLDEN CALLA**, South African, experimentally introduced at the Trujillo Plant Propagation Station in 1924, has ovate, white-spotted leaves, the spathe yellow.

Vol. V, p. 130, add at end of **Araceae**, a plant, apparently of this family, grown by Miss Noble in her garden at Condado, brought from Venezuela, has ovate repand long-petioled acuminate leaves, irregularly purple-blotched, pale beneath, the bases of the blades infolded; no flowers have been seen by us.

Vol. V, p. 137, **Catopsis nutans**, add to distribution, St. Croix.

Vol. V, p. 144, at end of Bromeliaceae add **Cryptanthus acaulis** (Lindl.) Beer [*Tillandsia acaulis* Lindl.] Brazilian, grown successfully at Louisenhøj, St. Thomas, the plants from the New York Botanical Garden in 1923, is an acaulescent decorative Bromeliad with spinulose-denticulate leaves.

Billbergia pyramidalis (Sims.) Lindl., Brazilian, also successfully grown and flowered at Louisenhøj, St. Thomas, in 1924, has strap-shaped, spinulose-dentate leaves 5–10 dm. long, about 6 cm. wide, and many corymbose-pyramidal reddish flowers about 5 cm. long, densely clustered on an erect bracted scape [*Bromelia pyramidalis* Sims].

Vol. V, p. 145, **Commelina elegans**, add Virgin Island name **WATER-GRASS**.

Vol. V, p. 146, add **Tradescantia virginiana** L., or a closely related species, was experimentally grown in shade at the Trujillo Plant Propagation Station in 1926. It has elongated linear leaves and showy umbellate blue flowers 3–5 cm. broad.

Vol. V, p. 148, at end of Commelinaceae, add **Spironema fragrans** Lindl. Mexican, grown at Louisenhøj, St. Thomas, from a plant sent from the New York Botanical Garden in December 1923, was luxuriant and decorative in large masses in March, 1925; its stems become about 1 m. long; its small white fragrant flowers are glomerate-paniculate, the oblong purple-margined acuminate leaves, 2–3 dm. long.

Vol. V, p. 150, add, several other species of **Cordyline** were well established at Louisenhøj, St. Thomas, in 1925, the plants sent from the New York Botanical Garden in 1923.

Vol. V, p. 151, **Allium fistulosum**, also grown at the Trujillo Plant Propagation Station in 1926.

Vol. V, p. 152, add **Hemerocallis fulva** L., **DAY LILY**, European, occasionally grown in Porto Rico flower-gardens, has long linear basal leaves, and a scape 1–2 m. high, bearing several orange flowers, the perianth funnelform, 10–12 cm. long.

A series of **Hemerocallis** hybrids, grown by Dr. A. B. Stout at the New York Botanical Garden, sent to the Trujillo Plant Propagation Station late in

1924, flowered freely in January 1925, and continued blooming for about nine months. **Hemerocallis Thunbergi** Baker and **H. Dumortieri** Morren, Japanese, were also seen at the same Station in 1925, as young plants.

Vol. V, p. 152, add, several species of **Brodiaea**, Californian, low bulbous plants with scapose flowers, were grown experimentally at the Trujillo Plant Propagation Station in 1925.

Niobe undulata (Otto & Dietr.) Nash, PLANTAIN-LILY, Japanese, occasionally grown in Porto Rico gardens has ovate petioled basal leaves and scapose lavender flowers. [*Funkia undulata* Otto & Dietr.; *Hosta undulata* Bailey.]

Niobe coerulea (Sweet) Nash, of northeastern Asia, similar to *N. undulata* but with blue flowers, was experimentally grown at the Trujillo Plant Propagation Station in 1925.

A plant with large cordate-orbicular, abruptly acuminate leaves, apparently a species of **Niobe**, brought from St. Kitts to Anna's Hope, St. Croix, by Mr. J. B. Thompson in 1923, under the name INDIAN LILY, had not flowered up to March, 1925.

Gloriosa superba, add notes, also in St. Thomas gardens, and luxuriant there; recently planted at the Trujillo Plant Propagation Station, Porto Rico.

Vol. V, p. 152, **Dracaena Draco**, add, a fine young plant, raised from seed was seen in the collection at Louisenhöj, St. Thomas, in March 1925.

Vol. V, p. 152, add **Dracaena marginata** Lam., Madagascan, grown at Louisenhöj, St. Thomas, from a cutting sent from the New York Botanical Garden in 1924, was well established in March 1925.

Large plants, similar to this species, but apparently distinct, were observed in Miss Manecke's garden, St. Thomas, in 1925.

Dracaena Godseffiana Sander, native of Guinea, grown for ornament in Porto Rico and Virgin Island gardens, has ovate to oblong white-mottled leaves 8-15 cm. long, the small greenish flowers racemose.

Add to note under horticultural varieties of **Dracaena**, also extensively cultivated for export by Mr. F. M. Pennock at his nurseries at Sabana Llana, Porto Rico.

Vol. V, p. 153, add at end of Liliaceae, **Bowiea volubilis** Harv., South African, sent to Mr. Antonin Nechodoma from the New York Botanical Garden late in 1924, was growing well in his garden at Monteflores, Porto Rico in February, 1926. It has a large globose bulb, only a little imbedded in the soil, from which slender twining stems 2-3 m. long arise, repeatedly branching, leafless or nearly so, bearing small greenish flowers.

Abumon africanum (L.) Britton, AFRICAN LILY, South African, grown in Porto Rican gardens, and at Louisenhöj, St. Thomas, has narrow basal leaves and umbellate flowers on a stout scape, the blue funnellform corollas 3-5 cm. long. [*Crinum africanum* L.; *Agapanthus africanus* Hoffmg.; *Agapanthus umbellatus* L'Her.]

Lilium longiflorum Thunb., EASTER LILY, Japanese, is occasionally grown in Porto Rico, but the climate is apparently too continuously warm for its suc-

cessful cultivation. It has a large scaly bulb, the stem 1 m. high or lower, the leaves linear-lanceolate, the few large white flowers declined or horizontal, the perianth trumpet-shaped, 10–15 cm. long.

Lilium tigrinum Ker, TIGER LILY, Japanese, flowered at the Trujillo Plant Propagation Station in May, 1925, also has scaly bulbs and linear leaves, the racemose red purple-spotted flowers drooping, their segments reflexed.

Chlorophytum elatum (Ait.) R. Br. [*Anthericum elatum* Ait.] South African, successfully grown at Louisenhøj, St. Thomas, and in Porto Rico, is a low linear-leaved plant, the small nearly white flowers racemose on slender scapes, the flower-clusters often transformed into tufts of short leaves.

Vol. V, p. 156, add **Hypoxis Wrightii** (Baker) Brackett, *Rhodora* **25**: 140. 1923.

Hypoxis decumbens Wrightii Baker, *Journ. Linn. Soc.* **17**: 106. 1878.

Differs from *Hypoxis decumbens*, in which it has been included, by much narrower leaves, only 0.5–3 mm. wide, the old sheaths fibrillose, the seeds with low, irregularly curving markings.

Grassy situations, Cataño, near Bayamon, Porto Rico, collected by Sintenis in 1885:—Florida; Bahamas; Cuba.

Vol. V, p. 159, add **Hippeastrum vittatum** Herb., Peruvian, successfully grown in several races by Mr. F. M. Pennock in 1925 at the nursery of the Porto Rico Pineapple Company, Sabana Llana, is taller than *H. puniceum*, with larger flowers, the perianth variously striped with red, or red throughout. The cut flowers of this Amaryllid wither only after several days if kept in water.

Vol. V, p. 160, add **Crinum augustum** Roxb., African, occasional in Porto Rico gardens, has large long leaves, the large flowers umbellate, with lanceolate segments 10–15 cm. long, bright red on the outer side.

Several other species of **Crinum** have recently been planted at the Trujillo Plant Propagation Station, including **C. americanum** L., of the southeastern United States; **C. Kirkii** Baker, African; **C. Kunthianum** Roemer, Colombian; **C. scabrum** Herb., tropical African; **C. campanulatum** Herb., South African; **C. fimbriatulum** Baker, of Guinea, and **C. erubescens** Ait.

Vol. V, p. 161, add at end of Amaryllidaceae, **Nerine sarniensis** (L.) Herb., GUERNSEY LILY, of South Africa, experimentally grown in 1925 at the Trujillo Station, flowers before its long narrow leaves appear, with an umbel of erect, red to crimson flowers on a scape about 3 dm. high; the 6 stamens are exerted beyond the 6 linear-oblong recurving perianth segments; the ovoid bulbs are about 5 cm. thick.

Vol. V, p. 161, add **Haemanthus coccineus** L., South African, grown at Louisenhøj, St. Thomas, in 1925, has a large bulb, two leaves, and densely umbellate red flowers on a long scape.

Vol. V, p. 161, under **Amaryllis Belladonna**, add, recently grown at the Trujillo Station but had not flowered up to the spring of 1926.

Ismene calathina (Ker) Herb., Andean, grown at the Plant Propagation Station, Trujillo, in 1925, has a long-necked bulb, several narrow leaves, and few long umbellate white flowers, the stamens short. [*Pancratium calathinum* Ker; *Hymenocallis calathina* Nicholson.]

Vallota purpurea (Ait.) Herb., South African, also grown at the Trujillo Station in 1925, has an ovoid bulb, linear leaves and a few-flowered umbel of large red flowers, the funnelform perianth 7–10 cm. long. [*Amaryllis purpurea* Ait.]

Narcissus Tazetta L., NARCISSUS, of southern Europe, occasionally grown for ornament in Porto Rico gardens, has bulbs about 5 cm. in diameter, linear leaves about as long as the flattened scape which bears an umbel of flowers, the perianth-tube cylindric, about 2 cm. long, the 5 white or yellow lobes spreading, 1–2 cm. long, the saucer-shaped crown yellow.

Vol. V, p. 164, add other species of **Dioscorea** were introduced at the Trujillo Plant Propagation Station in 1924.

Vol. V, p. 167, add at end of Iridaceae, varieties and hybrids of **Gladiolus**, occasionally planted in Porto Rico flower gardens, were seen in large variety, and freely flowering in March, 1925, at Mrs. Tower's garden, Pueblo Viejo and at Mr. Pennock's nursery, Sabana Llana. The parents of the cultivated species are African.

Vol. V, p. 167, at end of Iridaceae, add several North American species of **Iris** were experimentally grown at the Trujillo Plant Propagation Station in 1925.

Sparaxis tricolor (Curtis) Ker, WAND-FLOWER, South African, recently grown in several races at the Trujillo Station, has a small white corm, linear basal leaves 1.5–3 dm. long, the few showy flowers various in color [*Ixia tricolor* Curtis]

Moraea iridioides L., South African, grown at the Trujillo Station, appeared well established there in April, 1926. It has short rootstocks, narrow leaves in a basal rosette, the flowers white, 6–8 cm. broad, their outer segments with yellow claws.

Tigridia Pavonia (L.f.) Ker [*Ferraria Pavonia* L.f.] of Central America, also grown at the Trujillo Station in 1925, is a bulbous plant about 6 dm. high, with linear leaves the few or solitary, large, yellow or orange, often mottled flowers 10–15 cm. broad.

Marica coerulea Ker, South American, was seen in cultivation at Villa Leon, near Bayamon, Porto Rico, in 1926. It has bright green leaves 6 dm. or more long, the showy flowers 7–10 cm. wide, bright blue or lilac, the outer segments variegated at the base with transverse bars of brown, yellow and white.

Freesea refracta (Jacq.) Klatt, experimentally grown in 1926 near Baranquitas, Porto Rico, has fibrous-coated corms, linear leaves, and large flowers in 1-sided spikes, the perianth 2.5–4 cm. long, with lobes much shorter than the tube [*Gladiolus refractus* Jacq.].

Vol. V, p. 168, add **Musa textilis** Nee, ABACA, of the Philippine Islands, in the collection of the Mayaguez Experiment Station, where it was first planted by Mr. O. W. Barrett about 1904, is 2–4 m. high, the oblong-lanceolate leaves 1.5–2 m. long with a black line about 3 cm. from the right margin; its dark green seed-bearing fruits are about 8 cm. long.

Vol. V, p. 169, **Canna glauca**, add to distribution, St. Croix.

Vol. V, p. 170, **Canna edulis**, add, grown also at the Insular Experiment Station, Rio Piedras, Porto Rico in 1924, and elsewhere in Porto Rico.

Vol. V, p. 176, add at end of Alpinaceae, **Kaempferia rotunda** L., East Indian, occasionally grown in Porto Rico gardens, and reported by Mr. Antonin Nechodoma as escaped into woodlands near Jayuya, is nearly acaulescent, with large oblong-lanceolate leaves, appearing after the short-stalked purple and white flowers, the perianth-segments narrow.

Vol. V, p. 177, add **Maranta Kerchoveana** E. Morren, Brazilian, a low decorative species, with elliptic mottled leaves, grown at Louisenhøj, St. Thomas, the plants from the New York Botanical Garden in 1923, was well established in 1925; it was also established at the Trujillo Plant Propagation Station in 1925.

Vol. V, p. 179, **Apteria hymenantha**, add to habitat:—also in shaded white sand, near sea-level, Laguna Tortuguero, Porto Rico, detected by Professor E. E. Dale in 1924.

Vol. V, p. 190, add 12a. **WULLSCHLAEGELIA** Rchb. f. Bot. Zeit. 21: 131. 1863.

Leafless terrestrial orchids with fascicled roots, and slender stems bearing minute distant foliaceous scales, the small flowers racemose. Sepals erect. Petals small. Lip sessile on the base of the column. Column as long as broad, slightly incurved. Anthers erect, sessile, ovate, obtusely apiculate, capsule small, erect. Seeds minute. [Commemorates Heinrich Rudolf Wulschlagel 1805–1864, German botanist.] Two known species of tropical America, the following typical.

1. **Wulschlaegelia aphylla** (Sw.) Rchb. f. Bot. Zeit. 21: 131. 1863.

Cranichis aphylla Sw. Prodr. 120. 1788.

Stem 2–3 dm. tall, puberulent above. Racemes many-flowered, 3–12 cm. long; bracts equalling or shorter than the pedicels; sepals narrowly triangular, the dorsal 1.7 mm. long, the lateral 1.5 mm. long; petals oblong, obtuse, about 1.5 mm. long; lip broadly obovate, 2 mm. long; capsule ellipsoid, 8–9 mm. long.

Forest, Monte El Yunque, Sierra de Luquillo, Porto Rico, (Professor E. E. Dale, April, 1924):—Cuba; Jamaica; Dominica; South America.

Vol. V, p. 197, add 2. **Jacquinella teretifolia** (Sw.) Britton & Wilson.

Epidendrum teretifolium Sw. Prodr. 121. 1788.

Glabrous; stems slender, 9–30 cm. long. Leaves linear, semiterete, fleshy, sessile, 2.5–5 cm. long, 1.5–2.5 mm. thick; flowers solitary, erect, sessile; bracts 6–10 mm. long; sepals fleshy, linear-lanceolate, acute, 8.5–9.8 mm. long; petals linear-spathulate, obtuse 5–6 mm. long; lip linear, obtuse, 5–6 mm. long; column free, teretish; capsule ellipsoid, 1.5 cm. long.

Cerro de la Punta, 1320 m. altitude, March 18, 1926 [Gleason and Cook P. 10]:—Cuba; Jamaica; Hispaniola; Guadeloupe; Guatemala.

Vol. V, p. 198, add 25a. **DOMINGOA** Schlechter in Urban, Symb. Ant. 7: 496. 1913.

Epiphytic orchids with linear 1-leaved pseudobulbs and numerous filiform roots. Inflorescence usually simple, long-peduncled, the peduncle longer than the leaves. Sepals and petals nearly equal in size, spreading, 5-nerved. Lip free, emarginate. Column slender, slightly curved. Anthers cucullate. Pollinia 4. Ovary slender-pedicelled. [Named for the island of Santo Domingo.] Two known species natives of the West Indies, the following typical.

1. **Domingoa hymenodes** (Rchb. f.) Schlechter, loc. cit. 497. 1913.

Epidendrum hymenodes Rchb. f. *Flora* 48: 277. 1865.

Pseudobulbs elongated, compressed, 2–5 cm. long. Leaf thick in texture, oblong, 4–7 cm. long, 5–10 mm. wide, acute; scape slender, few-flowered; bracts minute, triangular-oblong, acute; flowers short-pedicelled; sepals and petals lanceolate, 12–13 mm. long, 3.5 mm. wide; lip obovate-oblong; column 9 mm. long.

On small trees, Mona:—Cuba; Hispaniola.

Vol. V, p. 202, **Tetramicra elegans**, add locality, limestone hill near Guayanilla (*Gleason and Cook, L. 118, 1926*).

Vol. V, p. 209, **Koellensteinia**, for genus number 52, read 42.

Vol. V, p. 212, under **Oncidium altissimum**, add St. Thomas, collected by Arthur S. Fairchild in 1925, a narrow-leaved, small-flowered race.

Vol. V, p. 213, under **Leochilus labiatus**, add note, Professor Mel T. Cook reported this orchid as abundant on grape-fruit trees near Trujillo Alta, Porto Rico, in July, 1925, and obtained specimens.

Vol. V, p. 217, at end of Orchidaceae, add note, many kinds of orchids, both native and introduced species, are grown in Porto Rico gardens, on trees, or in baskets, especially of the genera **Cattleya**, **Vanda**, **Oncidium** and **Schomburgkia**.

Vol. V, p. 219, **Casuarina stricta**, add, plants at the St. Croix Experiment Station had reached a height of 2 m. in March, 1925 and appeared vigorous; it was grown also at the Forest Station, Rio Piedras and had reached a height of about 7 dm. in the Spring of 1926.

Casuarina Cunninghamiana Miquel, Australian, grown at the Forest Station, Rio Piedras, Porto Rico, has smaller cones than those of **C. equisetifolia** and more slender branches. Young plants of **C. quadrivalvis** Labill., and of **C. suberosa** Otto & Dietr. grown from seed, were also seen there in 1926.

Casuarina distyla Vent., Australasian, added to the collection at the Mayaguez Station in 1925, was 6 dm. high in the spring of 1926. It is a shrub, described as not over about 1 m. in height.

Vol. V, p. 222, **Piper marginatum**, add, leaves anise-scented; also the Porto Rico name OLEROZO.

Vol. V, p. 222, under **Piper incurvum**, add, planted at the Trujillo Plant Propagation Station, appeared vigorous in February, 1926.

Vol. V, p. 223, add **Piper nigrum** L., BLACK PEPPER. East Indian, planted at the Trujillo Plant Propagation Station in 1924, and apparently luxuriant in February, 1925, is a vine, with broadly ovate glabrous 7–9-nerved leaves, the globose fruits black.

Vol. V, p. 232, add **Quercus Junghunii** Miquel, Javan, planted at the Mayaguez Experiment Station in 1922 was about 1.5 m. high in the spring of 1926, appearing vigorous. It is a tree with lanceolate leaves, the acorns small.

Vol. V, p. 232, after *Quercus palustris*, add *Alnus nepalensis* Don, NEPALESE ALDER, of the family *Betulaceae*, grown at the Forest Station, Rio Piedras, from seedlings received from the Bureau of Plant Industry in September, 1924, had reached a height of 1.5 m. in February, 1926, and appeared luxuriant. It is a deciduous-leaved tree becoming 30 m. high in its native home in the Himalayas; its leaves are elliptic, pale beneath, those of young plants serrulate with suborbicular stipules, those of older trees entire or nearly so.

Myrica rubra Sieb. & Zucc., introduced at the Mayaguez Station in 1925 was about 3 dm. high in March, 1926. It is native of eastern Asia.

Vol. V, p. 233, add, at end of *Juglandaceae*, *Pterocarya stenoptera* C. DC., Chinese, planted at the Experiment Station, Mayaguez in 1920, was about 1.5 m. high in April 1926. It is a pinnate-leaved tree, with oblong serrulate leaflets, the staminate flowers in aments, the fruit flat, winged.

Vol. V, p. 238, *Ficus laevigata*, add note, sometimes vine-like when growing on limestone cliffs, as observed between Arecibo and Utuado, Porto Rico; in April, 1925, a large tree was observed at Santurce, with long roots clasping a stone wall.

Vol. V, p. 238, under *Ficus Stahlia* add note, in April, 1925 an immense tree was observed at the foot of a limestone hill, above a spring, at Hacienda Esperanza, Barceloneta, about 25 m. in height with a trunk about 2 m. in diameter.

Vol. V, p. 238, *Ficus elastica*, add, the race with yellow-variegated leaves is occasionally planted in Porto Rico and the Virgin Islands.

Vol. V, p. 239, add *Ficus mysorensis* Heyne, East Indian, was seen as young plants in the collection of the Insular Experiment Stations at Rio Piedras and at St. Croix Experiment Station in 1925, and grown also at the Mayaguez Station. It forms a large tree, the young twigs tomentose, the ovate leaves 7-20 cm. long, tomentose beneath when young, the sessile fruit red, about 2 cm. long.

Ficus padifolia H.B.K., Mexican, was introduced in 1918, at the Experiment Station, Mayaguez, Porto Rico. Its leaves are elliptic to oblong, 5-9 cm. long, acuminate, slender-petioled, its globose short-stalked fruit about 10 mm. in diameter. The tree was about 10 m. high and vigorous in 1926.

Ficus macrophylla Desf., Australian, and *Ficus rubiginosa* Desf., also Australian, were introduced at the Forest Station, Rio Piedras, Porto Rico, in 1924. In the Spring of 1926, *F. macrophylla* had reached about 1 m. in height; *F. rubiginosa* was not as vigorous.

Ficus Parcellii Veitch, native of the South Sea Islands, seen as a fine specimen plant in Mrs. McKinley's garden, near San Juan, Porto Rico, in 1924 and 1925, has ovate crenate leaves 2-3 dm. long, tomentose beneath, and short-stalked fruits about 1.5 cm. in diameter.

Vol. V, p. 239, the species of *Ficus* noted but not identified is *Ficus Nekbuda* Warburg [*F. utilis* Sim.], African BARK-CLOTH TREE, native of East Tropical Africa. Luxuriant trees up to about 6 m. high, ornamented the grounds of the Condado Vanderbilt hotel in 1926; a cutting from one of these was established at Louisenhöj, St. Thomas.

Ficus Sycomorus L., Egyptian, seen at Villa Leon, near Bayamon, in 1925 is a small tree, with ovate chartaceous subcordate leaves 8-15 cm. long, the stout,

rather long petioles and the twigs puberulent; the short-peduncled flowers are borne on the trunk and the branches, the fruit about 2 cm. in diameter.

Vol. V, p. 239, **Pseudolmedia spuria**, add note, a specimen of the foliage of this tree, now rare in Porto Rico, was obtained by *Gleason and Cook* in the forest at La Sardinera, near Dorado, in March, 1926.

Vol. V, p. 240, add **Chlorophora excelsa** (Welw.) Benth. & Hook., of tropical Africa, grown from seed of 1924 at the Forest Station, Rio Piedras, was about 2 m. high in February 1926. It is a valuable timber tree, described as reaching a height of 40 m., the leaves elliptic-lanceolate, acuminate, serrulate, the fruit oblong-cylindric.

Vol. V, p. 241, add **Artocarpus Lakoocha** Roxb., East Indian, in the collection at the Mayaguez Experiment Station, planted in 1921, had reached a height of 8 m. in April 1926. It has oblong leaves, pubescent beneath, the smooth globose fruit about 6 cm. in diameter.

Vol. V, p. 242, after **Castilla elastica**, add, several other species of **Castilla** have recently been experimentally planted at the Agricultural Experiment Station at Mayaguez.

Castilla elastica add, also planted in St. Thomas several years ago, but not vigorous there in 1924.

Vol. V, p. 242, add **Brosimum Alicastrum** Sw.' of continental tropical America planted at the Experiment Station Mayaguez in 1920 had reached a height of about 3 m. in 1926, and appeared vigorous. It forms a large tree, with oblong-elliptic leaves, the small flowers monoecious the globose fruit about 2 cm. in diameter.

Under **Morus multicaulis** add, seen also at the St. Croix Experiment Station in 1925.

Vol. V, p. 252, add **Pellionia pulchra** N. E. Brown, of Cochin China, seen at the Trujillo Plant Propagation Station in 1926, is a creeping perennial, with obliquely oblong, obtuse leaves, blackish along the veins above, the under side purplish.

Vol. V, p. 254, add, 2. **XIMENIA** L. Sp. Pl. 1193. 1753.

Spinescent shrubs or trees, with entire, often fascicled leaves and small white or yellow, perfect axillary, solitary or cymose flowers. Calyx very small, 4-5-toothed. Petals 4 or 5, united only at the base, coriaceous, valvate, pubescent on the inner side. Stamens 8-10, the filaments filiform, the anthers linear. Ovary 3-celled; style simple; stigma subcapitate; ovules 3 or 4 in each cavity. Drupe with a fleshy exocarp and a woody or crustaceous stone. Embryo of the seed very small. [Commemorates Francesco Ximenes, a Spanish naturalist.] About 5 species, of tropical distribution, the following typical.

1. **Ximenia americana** L. Sp. Pl. 1193. 1753.

Ximenia inermis L. Sp. Pl. ed. 2, 497. 1762.

A thorny shrub or small tree, rarely 6 m. high, with reddish smooth astringent bark, the slender branches spreading. Leaves oblong to orbicular, subcoriaceous, 3-7 cm. long, obtuse or emarginate at the apex, narrowed or rounded at the base, sparingly pubescent when young, mostly glabrous when old, the slender petioles

5–10 mm. long; clusters 2–4-flowered, much shorter than the leaves; calyx about 1 mm. long; corolla-lobes linear, reflexed, 1 cm. long; drupe yellow or red, 12–17 mm. in diameter.

Thicket, Louisenhöj, St. Thomas, detected by Alphonso Nelthrop in 1925:—Florida; Jamaica; Bahamas; Cuba; Hispaniola; Guadeloupe to Trinidad; Margarita; continental tropical America and Old World tropics. Not yet definitely known from Porto Rico. SPANISH PLUM.

Vol. V, p. 262, *Aristolochia odoratissima*, add to distribution, St. Thomas.

Vol. V, p. 263, *Aristolochia ringens*, add, occasional in Virgin Island gardens.

Aristolochia galeata, add, also occasional in Virgin Island gardens.

Vol. V, p. 264, add, *Rumex Patientia* L., ESPINACA SIN AROMA, PATIENCE DOCK, European, experimentally grown at the Trujillo Plant Propagation Station, as a salad plant, in 1925, is a tall perennial, with lanceolate to oblong flat leaves, the calyx-wings orbicular, cordate.

Vol. V, p. 267, *Coccolobis diversifolia*, synonym, read 1760 not 7160.

Vol. V, p. 269, under *Coccolobis laurifolia*, for GLATEADO read GATEADO.

Vol. V, p. 270, add *Triplaris Cumingiana* Benth, raised from Panama seed at the Mayaguez Experiment Station in 1924, germinated freely and grew vigorously, reaching 1.5 m. in height in 1926; it was grown also at the Trujillo Station; it has oblong leaves, pubescent beneath.

Vol. V, p. 270, add at end of Polygonaceae, *Rheum Rhaponticum* L. RHUBARB, RUIBARBO, PIEPLANT, Siberian, experimentally grown in 1924 at the Trujillo Plant Propagation Station, is a tall perennial acid herb, with large succulent, petioled nearly orbicular cordate leaves, the petioles used for pies, the small paniced flowers white.

Vol. V, p. 274, add at end of Chenopodiaceae, *Enchylaena tomentosa* R. Br., Australian, raised from seed by Mr. A. S. Fairchild at Louisenhöj, St. Thomas in 1925, is a low shrubby plant with narrowly linear leaves 10–15 mm. long, the minute greenish flowers sessile and solitary in their axils.

Vol. V, p. 278, add *Amaranthus tricolor* L., probably Asiatic in origin, was seen as seedlings at the Trujillo Station in 1925.

Vol. V, p. 280, *Achyranthes Bettzickiana*, add, St. Thomas name, NATURE OF THE WORLD.

Achyranthes portoricensis, add note, when growing in wet shade the leaves become 6 cm. long and broad.

Achyranthes polygonoides, add to distribution, St. Croix.

Vol. V, p. 282, *Gomphrena dispersa*, add note, also in white sand Laguna Tortuguero, Porto Rico, appearing as if native; abundant in waste grounds, Arecibo, 1925.

Vol. V, p. 286, **Commicarpus scandens**, add to distribution, St. Croix.

Vol. V p. 298, **Talinum paniculatum**, add the race with variegated green and white leaves is occasionally grown in Porto Rico flower-gardens.

Vol. V p. 300 **Portulaca halimoides**, add petals 4 or 5 white, in specimens at Coamo Springs.

Vol. V, p. 309, **Magnolia portoricensis**, add common name MAURICIO, communicated by Commissioner Chardon.

Vol. V, p. 309, add, at end of Magnoliaceae, **Michelia fuscata** Blume [*Magnolia fuscata* Andr.] BANANA-SHRUB, Chinese, seen at Mr. Vivell's garden, Happy Hallow, Porto Rico, in 1926, is an evergreen shrub with oblong shining leaves and fragrant yellowish-carmine axillary flowers about 3 cm. broad.

Vol. V, p. 313, **Annona diversifolia**, add, grown also at the Insular Experiment Station, Rio Piedras, and at the Trujillo Station, Porto Rico, in 1924 and at Louisenhøj, St. Thomas, in 1925.

Annona Cherimolia, add, occasionally planted for its fruit in Porto Rico.

Annona purpurea Moç. & Sessé, Mexican, was introduced at the Mayaguez Experiment Station in 1918, and was about 1.5 m. high and vigorous in the spring of 1926. It is a medium sized tree, with deciduous oblong leaves 2-3 dm. long, very large flowers with petals purple within, the subglobose fruit 1-2 dm. in diameter, with rigid pyramidal protuberances.

Annona senegalensis Pers., of tropical Africa, was planted at the Insular Experiment Station, Rio Piedras, in 1924 and had reached a height of over 1 meter in May 1925, and appeared thrifty, as well as another plant introduced in 1925; it is a small tree or shrub, with elliptic leaves tomentose or pubescent beneath, the orange or yellow, nearly smooth fruit about 4 cm. in diameter.

Vol. V, p. 314, at end of Annonaceae, add, **Artabotrys odoratissima** R. Br., CLIMBING YLANG-YLANG, East Indian, grown at the Trujillo Plant Propagation Station, forms a long woody vine, which climbs by its thick peduncles; it has oblong to lanceolate, shining leaves, the flowers solitary, or two together, very fragrant.

Monodora tenuifolia Benth., a tree of tropical Africa, recently introduced at the Trujillo Station, was about 1.5 m. high in April 1926, and appeared luxuriant. It is a small tree, with thin oval leaves 7-12 cm. long, the flowers 5-10 cm. broad with greenish-white outer petals, the ovoid fruit 7-10 cm. long, many-seeded.

Polyalthia suberosa (Roxb.) B. & H., East Indian, seen in the collection at the Mayaguez Station in 1926, is a small tree, with oblong, obtuse leaves 5-10 cm. long, mostly solitary reddish brown flowers 2-3 cm. broad, the globose carpels about 7 mm. in diameter [*Uvarias tuberosa* Roxb.].

Vol. V, p. 314, at end of Annonaceae, add **Myristica fragrans** Houtt., NUTMEG, of the family **Myristicaceae**, native of the Molucca Islands, widely grown for its fruit in tropical regions, was planted at the Mayaguez Experiment Station about 1909, and a fine tree about 6 m. high was seen there in 1926. It has elliptic glabrous entire petioled leaves 5-12 cm. long, the apex acuminate,

and small axillary apetalous flowers; the fleshy subglobose or pyriform fruit splits into two valves, the single seed surrounded by the scarlet laciniate aril (mace).

Vol. V, p. 318, add 3. ***Persea portoricensis*** Britton & Wilson, sp. nov.

A shrub 2 m. high, the young twigs appressed-pubescent. Leaf-blades oblong-lanceolate to elliptic, 5-10 cm. long, 2.5-4.5 cm. broad, coriaceous, the apex acuminate, the base rounded, glabrous above, pubescent beneath with short appressed hairs; petioles 1-2 cm. long, glabrous in age; inflorescence shorter than the leaves; pedicels 3 mm. long, appressed-pubescent; calyx appressed-pubescent, its lobes unequal, the outer 1.5 mm. long, 2 mm. broad, the inner 3 mm. long, 2.5 mm. broad; drupe (immature) subglobose, 7 mm. in diameter.

Slopes of Cerro de la Punta, 1320 m. altitude, March 18, 1926 (*Gleason and Cook P. 11; P. 18 type; P. 69*).

Vol. V, p. 318, add ***Persea Schiedeana*** Nees, COYO, GUATEMALA AVOCADO, Central American, introduced at the Insular Experiment Station, Rio Piedras in 1923, has densely tomentose twigs, the leaves pale and pubescent on the under side, the fruit like that of the Avocado, but the fleshy with milky juice and the flavor of coconut.

Persea drimophila Schl. & Cham., AGUACATE DE MEXICO, Mexican, has small, anise-scented leaves, acute or acuminate, the fruit with a thin skin. It is in cultivation at the Trujillo Plant Propagation Station and at the Insular Experiment Station, Rio Piedras.

Vol. V, p. 321, add ***Ocotea Rodiei*** (Schomb.) Mez., GREENHEART, a tree of British Guiana, 30-40 m. high, has glabrous shining oblong-elliptic leaves abruptly acuminate at the apex, the hemispheric cupule 2.5 cm. in diameter; it was introduced by seed from the Botanical Garden at Demarara into the forest nursery at Rio Piedras in 1924, and had reached about 3 dm. in height by the spring of 1926 [*Nectandra Rodiei* Schomb.].

Vol. V, p. 327, add ***Brassica pekinensis*** Rupr., CHINESE CABBAGE, grown for food in Porto Rico has obovate thin crisped leaves, its flowers pale yellow.

Brassica japonica (Thunb.) Sieb., Asiatic, with the basal leaves incised-pinnatifid, was grown at the Trujillo Plant Propagation Station in 1924. [*Sinapis japonica* Thunb.; *B. juncea japonica* Bailey.]

Brassica caulorapa Pasq., KOHLRABI, COLINABO, of old world origin, unknown in a wild state, occasionally grown for food in Porto Rico, is biennial, the short stem enlarged just above the ground, its glaucous long-petioled leaves oval, dentate or few-lobed, its flowers pale yellow.

Vol. V, p. 330, add ***Iberis umbellata*** L., of southern Europe, occasionally grown in Porto Rico flower gardens, is low, annual, the leaves lanceolate, the rose to purple flowers in short broad corymbs.

Lunaria annua L., HONESTY, European, a tall annual, grown by Mrs. Maxwell in her flower garden at Ensenada, Porto Rico, in 1925, has broad toothed leaves, large purplish racemose flowers, and large flat pods 2-3 cm. long.

Armoracia Armoracia (L.) Cockerell, HORSE-RADISH, European, experimentally grown in 1926 at the Trujillo Plant Propagation Station, is a glabrous perennial, 6-10 dm. high, with large pungent roots, oblong basal leaves 2-4 dm. long, white flowers in racemes, the small pods subglobose. [*Cochlearia Armoracia* L.]

Vol. V, p. 338, add **Bryophyllum crenatum** Baker, Madagascan, sent from the New York Botanical Garden to Louisenhøj, St. Thomas, was luxuriant there in March, 1925. It has oblong, deeply crenate, simple leaves 6–10 cm. long, the calyx about 2 cm. long, the corolla with orbicular crimson lobes.

Vol. V, p. 339, add **Kalanchoe somaliensis** Hook. f., African, grown at Louisenhøj from a plant from the same source, was also luxuriant there in March, 1926. It is a tall branched plant with obovate cuneate-dentate rounded leaves 1–1.5 dm. long, the many flowers showy, the corolla yellowish-white with a slender tube 5–6 cm. long, the limb 2–2.5 cm. broad.

Kalanchoe cassiopeja Dammann, and **Kalanchoe glaucescens** Britten, of tropical Africa, sent from the New York Botanical Garden to Mr. Antonin Nechodoma, Monteflores, Porto Rico, late in 1924, were apparently well established in his garden in February, 1925, but had not flowered.

Kalanchoe crenata (Vent.) Haw., seen at the Trujillo Plant Propagation Station in April 1925, was vigorous and freely flowering. It becomes 1–2 m. high, the oblong to elliptic leaves 5–10 cm. long, coarsely crenate, the numerous bright yellow or orange flowers with a corolla-tube 10–12 mm. long, the limb about 10 mm. broad. [*Cotyledon crenata* Vent.]

Vol. V, p. 339, at end of Crassulaceae add **Crassula multicava** Lemaire, probably native of South Africa, established at Louisenhøj, St. Thomas, from New York Botanical Garden cuttings sent in 1923, is herbaceous, with convex cordate leaves about 6 cm. long, and numerous small pinkish-white flowers in terminal panicles.

Byrnesia Weinbergii Rose, Mexican, its native home long unknown, grown by Mr. Antonin Nechodoma at Monteflores, Porto Rico, from cuttings sent from the New York Botanical Garden in 1924, was established there in February 1925. Cuttings sent from the same source to Mr. A. S. Fairchild at Louisenhøj, St. Thomas, in 1923, appeared established in 1925. Plants brought by Miss Noble from Havana, Cuba, to her garden at Condado, Porto Rico, several years ago were elegant and luxuriant in 1925. It would appear that this fine succulent was well adapted to cultivation in Porto Rico and the Virgin Islands. Its obovate to oblanceolate leaves, forming rosettes, are thick, fleshy, pale green, 4–6 cm. long, its white flowers cymose, about 1.5 cm. broad, the corolla rotate, its lobes united at the base.

Sedum mexicanum Britton, Mexican, sent to Louisenhøj, St. Thomas, from the New York Botanical Garden in 1923, had made good growth by March, 1925; it has linear subterete leaves and bright yellow flowers.

Sedum diffusum S. Watson, Mexican, grown by Mr. Antonin Nechodoma at Monteflores, Porto Rico, on concrete, from cuttings transmitted from the New York Botanical Garden late in 1924, is a small spreading succulent plant, with subterete linear leaves about 8 mm. long, which appeared luxuriant there in February, 1925, its flowers are small, white.

Vol. V, p. 342, add **Rubus moluccanus** L., East Indian, experimentally grown at the Insular Experiment Station, Rio Piedras, in 1925, is a tomentose plant, with simple toothed leaves.

Rubus fraxinifolius Poir., Javan, also grown in 1925 at the Insular Experiment Station, has pinnate leaves of 5 or 7, ovate, strongly pinnately veined, sessile leaflets, pale beneath, its slender stems intensely white-glaucous.

Rubus Macraei A. Gray, Hawaiian, was also planted at the Insular Experiment Station in 1925. It is a prickly plant with 3-foliolate leaves tomentose beneath, the fruit described as deep red and 4-5 cm. in diameter.

Several other species of **Rubus** have been grown at the Insular Experiment Station, Rio Piedras.

Vol. V, p. 343, add **Filipendula Ulmaria** (L.) Maxim., QUEEN OF THE MEADOW, European and Asiatic introduced at the Trujillo Plant Propagation Station, did not appear to be vigorous there in the Spring of 1926. It is a tall herbaceous perennial, with pinnately 3-9-foliolate leaves, and small paniced white flowers [*Spiraea Ulmaria* L.].

Filipendula Filipendula (L.) Voss., European, also experimentally grown at the Trujillo Station in 1926, has pinnately dissected leaves, the flowers similar to those of *F. Ulmaria* [*Spiraea Filipendula* L.]. The climate is too continuously warm for plants of this genus.

Spiraea prunifolia Sieb. & Zucc., BRIDAL WREATH, Chinese, grown occasionally in St. Thomas flower-gardens, and luxuriant there, is a low shrub, with oblong serrulate leaves, pale beneath, the usually double, small white flowers corymbose.

Spiraea Van Houttei Zabel, seen at the Trujillo Plant Propagation Station in April, 1926, is a low shrub of hybrid origin, the leaves rhombic-ovate, coarsely serrate.

Vol. V, p. 343, after **Eriobotrya japonica**, add **Raphiolepis indica** Lindl., a shrub with lanceolate or oblanceolate, thick shining toothed leaves 5-7 cm. long, the racemose flowers tinged with pink, about 12 mm. broad, the fruit a small pome, was recently introduced at the Trujillo Station.

Vol. V, p. 343, after **Malus Malus**, add **Pyrus communis** L., PEAR, PERA, European and Asiatic, has occasionally been planted in Porto Rico, but the climate is not suitable for its successful development.

Vol. V, p. 346, add **Amygdalus persica** L., DURAZZO, PEACH, of Chinese origin, has occasionally been planted experimentally in Porto Rico and the Virgin Islands, but does not succeed. A tree about 1.5 m. high was seen at the St. Croix Experiment Station in 1925.

Vol. V, p. 347, under **Inga Inga**, add synonyms.

Inga vera lamprophylla Pittier, Contr. U. S. Nat. Herb. 18: 216. 1916.
Inga vera portoricensis Pittier, Contr. U. S. Nat. Herb. 18: 217. 1916,

Vol. V, p. 350, add **Anneslia haematocephala** (Hassk.) Britton & Wilson, [*Calliandra haematocephala* Hassk.], raised from seed at the Forest Station, Rio Piedras in 1925, is a shrub, its original habitat unknown; the numerous leaflets are oblong-lanceolate, 1-3 cm. long, the pod about 10 cm. long, the capitate flowers blood-red.

Vol. V, p. 351, **Albizzia procera**, add, many luxuriant plants were seen at the Forest Station, Rio Piedras, in 1926, from seed sown in August, 1924. Some of these had attained a height of over 2 m. in February, 1926.

Vol. V, p. 351, add **Albizzia carbonaria** Britton, sp. nov.

A tree, 8 m. high or higher, the foliage and inflorescence tomentulose-pubescent. Leaves bipinnate, 1.5-3 dm. long; the petioles 2-4 cm. long, bearing

1 or 2 sessile orbicular glands, or glandless; pinnae 12–16 pairs, nearly sessile, 6–10 cm. long; leaflets 12–30 pairs, obliquely oblong, or the upper one obovate, obtuse, 5–10 mm. long, the midvein eccentric; panicles shorter than the leaves, the numerous heads several-flowered; calyx narrowly campanulate, about 2 mm. long, its teeth short; corolla about twice as long as the calyx; stamens white, 10–12 mm. long; pod flat, linear-oblong, 7–10 cm. long, 14–18 mm. wide, pubescent, short-pointed, narrowed at the base, the valves with thickened margins, its stalk about 1 cm. long; seeds 15–25, transverse, oblong, about 4 mm. long, rounded at both ends.

Grown at the Forest Station, Rio Piedras, Porto Rico, from seedlings received in 1921, from the Bureau of Plant Industry; the seed was procured from Palmira, Colombia, in 1920. Type collected by *C. L. Bates*, October, 1924, at the Forest Station, Rio Piedras; other specimens collected by *N. L. Britton* in 1923, 1924 and 1925. **CARBONERO.** This is the tree noted in Vol. V, p. 355, as perhaps a species of *Acacia*.

Albizzia lophantha (Willd.) Benth. [*Acacia lophantha* Willd.] Australian, grown from seed at the Forest Station, Rio Piedras, in 1925, reached a height of 6 dm. in February, 1926. It is described as a small tree or shrub with flowers in cylindric axillary spikes.

Albizzia mollis (Wall.) Boiv., East Indian, seen on the Estabrook Estate near La Muda, Porto Rico, in 1925, is a spreading tree about 12 m. high, the trunk 2.5 dm. in diameter, the gray bark smooth, the pubescent bipinnate leaves 3–4 dm. long, with about 14 pairs of nearly sessile pinnae, the very numerous leaflets obliquely lanceolate, 12 mm. long, with midveins nearly marginal, the linear-oblong flat pods 10–13 cm. long, 2 cm. wide. [*Acacia mollis* Wall.]

Vol. V, p. 354, add **Acacia Koa** A. Gray, Hawaiian, recently grown from seed at the Forest Station, Rio Piedras, is a large spreading tree, the young leaves bipinnate, with numerous oblong leaflets about 6 mm. long, the mature foliage of falcate coriaceous phyllodes 10–18 cm. long, 3–20 mm. wide, the small white flowers in globose heads.

Acacia Baileyana Muell., Australian, grown from seed at the Forest Station, Rio Piedras, in 1925, was about 2.5 dm. high in February, 1926. It is a small tree, or shrub, with small gray pinnate leaves, the flowers capitate.

Acacia Melanoxydon R. Br., Australian, also grown from seed at this Forest Station, is a tree with falcate-lanceolate phyllodes 7–10 cm. long, the flowers capitate, the pod linear, curved, 6–8 mm. broad.

Vol. V, p. 361, **Enterolobium cyclocarpum**, add name **DORMILÓN.**

Add **Enterolobium contortisiliquum** (Vell.) Morong, South American, was grown from seed planted in December, 1924, at the Forest Station, Rio Piedras; trees about 2 m. high appeared thrifty in February, 1926. It is a large tree, similar to *E. cyclocarpum*, but with fewer and larger leaflets, the pod smaller. [*E. Timbouva* Mart.]

Vol. V, p. 361, add **Parkia javanica** (Lam.) Merrill, of East India and the Philippines, grown from seed at the Forest Station, Rio Piedras, in 1924, had reached a height of 1.3 dm. in February, 1926. [*P. timoreana* (DC.) Merrill.]

Vol. V, p. 363 for **Bauhinia Ungala** read **Bauhinia Ungula.**

Vol. V, p. 363, add **Bauhinia malabarica** Roxb., East Indian, raised from seed at the Forest Station, Rio Piedras, planted in May 1924, had reached a

height of 2 m. in February 1925, freely flowering and fruiting the first year, and luxuriant, it has broad cordate 2-lobed leaves, and flat pods about 2 dm. long, 2 cm. wide.

Bauhinia purpurea L., East Indian, occasionally planted for ornament in Porto Rico, is a shrub or small tree, with deeply 2-lobed, nearly orbicular, slightly cordate leaves, the corymbose purple flowers large, with 3 or 4 fertile stamens, the pod 1.5-3 dm. long, 2-2.5 cm. wide.

A species of **Bauhinia**, with wand-like stems about 1.5 m. long, the small short-petioled leaves 4-5 cm. broad, wider than long, deeply emarginate at base and apex, with rounded lobes, puberulent and reticulate-veined on both sides, was seen at the St. Croix Experiment Station in 1925, with foliage only.

Vol. V, p. 364, **Cynometra portoricensis**, distribution, limestone hills and cliffs, northern and northeastern districts.

Vol. V, p. 364, **Stahlia monosperma**, add note, seeds of this rare tree obtained from southwestern Porto Rico in 1925, germinated at the Forest Station, Rio Piedras, and many vigorous young trees 4-7 dm. high were seen there in the Spring of 1926. A colony was observed near Ceiba, on the eastern coast, by Dr. Cook and Dr. Gleason, in February, 1926, and another near Boqueron, on the western coast by Prof. Cowles, in April, 1925.

Vol. V, p. 365, last line of key, for pod 3-5 cm. wide, read 3-5 mm.

Vol. V, p. 367, **Chamaecrista grammica**, add to distribution, Water Island, St. Thomas.

Vol. V, p. 369, **Cassia siamea**, add, also introduced into Porto Rico where it grows vigorously.

Vol. V, p. 372, **Ditremexa hirsuta**, add, occasional in waste and cultivated grounds, at middle and lower altitudes, Porto Rico, appearing as an introduced weed.

Vol. V, p. 373, add **Peirania multijuga** (Rich.) Britton & Rose, of northern South America, grown at Louisenhöj, St. Thomas, in 1925, from Trinidad seed, forms a tree, its glabrous leaves with many pairs of oblong pale mucronulate leaflets 2-3 cm. long, a cylindric gland between the lowest pair; the large yellow flowers are in paniced racemes; the pod is linear, flat, about 10 cm. long. [*Cassia multijuga* Rich.]

Vol. V, p. 378, **Libidibia coriaria**, add, recently planted at the Mayaguez Experiment Station.

Libidibia punctata, add, a tree about 8 m. high was seen at the University of Porto Rico, Rio Piedras, in 1925; flowering specimens were communicated by Professor J. S. Dexter.

Vol. V, p. 379, **Guilandina Bonduc**, citation, read Sp. Pl. 381.

Vol. V, p. 380, **Biancaea Sappan**, add note, luxuriant plants 2 m. high, were seen at the Forest Station, Rio Piedras in 1926, grown from seed of 1924; recently planted also at the Mayaguez Experiment Station.

Vol. V, p. 381, **Peltophorum ferrugineum**, add, also in the collection at the Mayaguez Experiment Station, in the hotel garden, Condado, and at the University, Rio Piedras, 1925.

Vol. V, p. 381, for **Hermesius** read **Hermesias**.

Vol. V, p. 381, add **Hermesias grandiceps** (Jacq.) Kuntze, Venezuelan, was seen as a young plant at the Trujillo Plant Propagation Station in 1926. It is a pinnate-leaved tree with showy red flowers in large heads.

Vol. V, p. 381, add at end of Caesalpinaceae, **Intsia bijuga** (Coleb.) Kuntze, Polynesian, was seen as seedlings at the St. Croix Experiment Station, in 1925.

Pahudia rhomboidea (Blanco) Prain, Philippine, grown from seed at the Forest Station, Rio Piedras in 1924 had reached a height of 5 dm. in the spring of 1926. It is a large tree with pinnate leaves, the broadly orbicular solitary petal yellowish-red, the woody pod thick, somewhat rhomboid.

Schotia latifolia Jacq., of South Africa, seen at the Trujillo Plant Introduction Station in 1926, as a young tree about 2 dm. high, forms a small tree with evenly pinnate leaves, coriaceous obtuse leaflets, large paniced pink flowers and oblong pods 4-10 cm. long.

Vol. V, p. 385, **Ormosia dasycarpa**, add, seedlings were seen at the Forest Station, Rio Piedras, in 1925.

Vol. V, p. 386, **Crotalaria striata**, add, cultivated and luxuriant at the Trujillo Plant Propagation Station in 1926.

Vol. V, p. 387, **Crotalaria verrucosa**, add to distribution, cultivated ground near Trujillo Alto, Porto Rico, a single plant observed and collected in January 1925.

Vol. V, p. 388, add **Crotalaria anagyroides** H.B.K., of Trinidad and northern South America, grown at the Mayaguez Experiment Station, is a tall species with 3-foliolate leaves and showy racemose yellow flowers.

Crotalaria Retzii Hitchc., East Indian, also grown at the Mayaguez Station, has simple oblong leaves, silky beneath, the yellow flowers in lax racemes. [*C. sericea* Retz, not Burm. f.]

Vol. V, p. 391, **Cracca candida**, add, cultivated and luxuriant at the Trujillo Plant Propagation Station in 1926, and also grown at the Agricultural Experiment Station, Mayaguez; for **caudida** on that page read **candida**.

Cracca hirta (Hamilt.) Britton & Wilson, East Indian, luxuriant at the Trujillo Station in the spring of 1926, is a tall species, nearly 2 m. high, the linear pods brown-hairy [*Galega hirta* Hamilt.; *Tephrosia Hookeriana* W. & A.; *Cracca villosa hirta* Kuntze].

Vol. V, p. 393, add **Sabinea carinalis** Griseb, native of the island Dominica, grown at the Forest Station, Rio Piedras, Porto Rico, and also at the St. Croix Experiment Station and at Louisenhöj, St. Thomas, from seed brought by Mr. O. W. Barrett from Dominica in April, 1924, had attained a height of 1.5 m. in February, 1925. It is a shrub, the pinnate leaves with 12-16 oblong leaflets, the flowers scarlet, with a keel about 3 cm. long.

Vol. V, p. 394, **Corynella pauciflora**, in description, keel-petals deep-violet purple, acutish, rather than obtuse.

Vol. V, p. 395, add **Sesban bispinosus** (Jacq.) Rydb. N. A. Flora **24**: 203. 1924.

Aeschynomene bispinosa Jacq. Ic. Pl. Rar. **3**: 13. 1793.

A shrub, 3 m. high or less, often armed with short prickles. Leaves 1–3 dm. long; leaflets 20–40 pairs, linear-oblong, 1–1.5 cm. long, 2–3 mm. wide, rounded and mucronate at the apex; racemes 1–1.5 dm. long, 3–10-flowered, pedicels about 1 cm.; calyx 4.5–5 mm. high, 4 mm. broad, its teeth deltoid, 1 mm. long; corolla 10–12 mm. long, the standard yellow, dotted with reddish-brown, rarely orange throughout; pod 1.5–2 dm. long, 3 mm. wide, many-seeded; seeds about 3 mm. long, 1.5 mm. wide.

Collected by Prof. F. L. Stevens at Guayanilla, Porto Rico (*No. 5926*):—southern Mexico; Jamaica; Lesser Antilles; Curacao; native of tropical Africa and Asia.

Vol. V, p. 401, **Meibomia supina**, add to description, flowers rarely white. The prior name for this species is **Meibomia cana** (Gmelin) Blake [*Hedysarum canum* Gmel.].

Vol. V, p. 404, add **Meibomia cubensis** (Griseb.) Schindl. Repert. **20**: 147. 1924.

Desmodium cubense Griseb. Cat. Pl. Cub. **73**. 1866.

Stems slender, ascending, villous. Leaves 1-foliolate, the leaflet ovate-oblong to oblong-linear, 3–5 cm. long, glabrate above, villous and reticulate-veined beneath, short-petioled; loment 1-jointed, rhombic-ovate, puberulent, 8 mm. long, reticulate-veined, its stipe about as long as the calyx.

Monte Santana, near Coamo, Porto Rico, collected by Sintenis (according to Urban):—Cuba; Hispaniola.

Vol. V, p. 407, add **Pterocarpus macrocarpus** Kurz, Burmese, was introduced at the Experiment Station, Mayaguez, in 1923; it had reached a height of about 1 m. in the spring of 1926.

Pterocarpus indicus Willd., of tropical Asia, luxuriant seedlings of which were seen at the Forest Station, Rio Piedras in 1926, from seed sown in 1924, is a large tree, the leaves with 7–11 ovate leaflets, the flowers in large panicles, the orbicular winged pod 5–7 cm. in diameter.

Vol. V, p. 408, add, seedlings of **Lonchocarpus Benthamianus** Pittler [*L. violaceus* H.B.K.] of the Lesser Antilles and Venezuela, and of **Lonchocarpus sericeus** H.B.K., of the southern Antilles and northern South America, were seen at the Forest Station, Rio Piedras, in 1925.

Vol. V, p. 428, add **Erythrina tomentosa** R. Br., of Abyssinia, introduced at the Agricultural Experiment Station, Mayaguez in 1924, made slow growth, reaching 6 dm. in height in 1926. It is a tree with densely tomentose foliage and moniliform pods.

Seedlings of **Erythrina fusca** Lour., of Cochin China, and of **Erythrina viarum** Todaro, original habitat unknown, were seen at the Forest Station, Rio Piedras, in 1926.

Erythrina monosperma Gaud., Hawaiian, introduced at the Forest Station, Rio Piedras in 1924 grew slowly in 1925. It is a small tree, the suborbicular leaves broader than long, the bright red seeds usually single in a pod.

Vol. V, p. 429, **Dalbergia Sissoo**, add note, young trees were seen at the Forest Station Rio Piedras, in 1926, having reached a height of 3 m. from seed of 1924.

Dalbergia lanceolaria L.f., East Indian, grown from seed of 1924 at the Forest Station, Rio Piedras, was about 1 m. high and thrifty in May 1925. It is a tall pinnate-leaved tree, the 11-15 leaflets blunt, the pod 3-10 cm. long.

Vol. V, p. 429, at bottom, add note. The tree in the park at St. Thomas, has now been determined, from flowering branches collected by Mr. A. S. Fairchild in April, 1926, as **Platymiscium trinitatis** Benth., native of Trinidad; its yellow flowers, about 1 cm. long, are borne in pubescent axillary racemes.

Vol. V, p. 429, at end of Fabaceae, add **Camoensia maxima** Welw., of tropical Africa, grown as a young plant at the Trujillo Plant Propagation Station in 1926, is a woody vine with 3-foliolate leaves, and very large racemose white flowers tinged with golden-yellow.

Daubentonia punicea (Cav.) DC., of tropical continental America, seen as a young plant at the Trujillo Station in 1925, is a shrub or small tree with pinnate leaves of 6-20 pairs of linear oblong leaflets 1-3 cm. long, the racemose scarlet flowers about 1.5 cm. long, the 4-winged oblong indehiscent pod 4-7 cm. long. [*Piscidia punicea* Cav.]

Castanospermum australe Cunn. & Fraser, Australian, planted at the Agricultural Experiment Station, Mayaguez, was about 1.5 m. high and vigorous in March, 1926; it is a pinnate-leaved tree, with large yellow flowers in racemes.

Ervum Lens L. [*Lens esculenta* Moench], LENTIL, LENTEJAS, European, occasionally grown in Porto Rico for its edible seeds, but not likely to be vigorous unless at high elevations, is a low annual, with pinnate leaves of 2-7 pairs of oblong entire leaflets about 1 cm. long, few small, nearly white flowers, the short pods 1-2-seeded, the seeds lenticular.

Coumarouna odorata Aubl. [*Dipteryx odorata* Willd.], grown for forestry purposes in Porto Rico, is a pinnate-leaved tree, the finely reticulate leaflets elliptic or ovate, the petioles and rachis flattened, the brown ellipsoid fruit 5 cm. or more long. It is native of northern South America.

Toluiфера pereirae (Kl.) Baill, BALSAM OF PERU, South American, is a pinnate-leaved tree, the leaflets ovate, the rather small flowers racemose, the fruit obliquely and narrowly oblong, winged, flat, bearing the single seed at the enlarged upper end; it was observed at the Mayaguez Experiment Station. [*Myroxylon pereirae* Kl.]

Derris scandens (Roxb.) Benth., of southern Asia, a pinnate-leaved vine, occasionally planted for ornament in the Virgin Islands, made growth of about 5 m. in a few months at Louisenhöj, St. Thomas; its 9-18, oblong leaflets are 2-5 cm. long, its rose-colored flowers in long racemes, its elongated lanceolate pod indehiscent. [*Dalbergia scandens* Roxb.]

Calpurnia sylvatica (DC.) E. Meyer, of South Africa, planted some years ago at Estate Grange, St. Croix, flowering there in November, 1925, is a glabrous shrub or small tree 3-5 m. high, with pinnate leaves, the oblong or obovate-oblong, retuse leaflets 3-4 cm. long, the yellow racemose flowers about 15 mm. wide, the pod linear, flat [*Virgilia sylvatica* DC.].

Melilotus alba Desv., TREBOL HUBAM, HUBAM CLOVER, an annual race of this species, recently introduced into Porto Rico as a forage crop, is herbaceous, about 2 m. tall, with 3-foliolate leaves, the leaflets oblong, the small white flowers in slender racemes.

Gourliea decorticans Gill, Argentinian, seen at the St. Croix Agricultural Experiment Station and at Mr. Kane's garden at Rio Piedras, Porto Rico in 1925, is a small thorny tree, with unevenly pinnate leaves, the leaflets oblong, 1-3 cm. long, the bark exfoliating, the small yellow flowers in short lateral racemes.

Soja Max (L.) Piper [*Phaseolus Max* L.], SOY BEAN, Japanese, experimentally grown at the Mayaguez Experiment Station and elsewhere in Porto Rico as a forage and food crop, is an herbaceous annual, about 1 m. high or lower, the leaves 3-foliolate, the ovate leaflets 7-15 cm. long, the small, nearly white flowers in axillary racemes, the flattened pods linear, 5-7 cm. long, the seeds globose.

Cyamopsis psoralioides DC., GUAR., East Indian, is annual, herbaceous, erect, the leaves 3-foliolate, the small purplish flowers in axillary racemes; it has recently been grown at the Trujillo Plant Propagation Station.

Vol. V, p. 431, under **Ionoxalis intermedia**, add note: erroneously recorded by Urban as *Oxalis latifolia*.

Vol. V, p. 434. The *Erythroxyton* recorded at the top of this page is 5. **Erythroxyton rufum** Cav. Diss. 404. 1789.

A shrub, or small tree up to about 6 m. high. Leaves ovate-oblong to obovate, 6-10 cm. long, strongly reticulate-veined, subcoriaceous when mature, the apex obtuse or emarginate, the base narrowed or obtuse, dark green above, paler and somewhat rufous beneath, scarcely areolate, the petioles 4-10 mm. long; stipules striate, lanceolate, 3-5 mm. long; pedicels filiform, clustered, thickened above, 1-2 cm. long; calyx-lobes ovate, acute, 1.5-2 mm. long; petals about 4 mm. long; drupes oblong, about 10 mm. long.

Hillsides, vicinity of Maricao, Porto Rico:—Cuba; Hispaniola; northern South America.

Vol. V, p. 436, add **Guaiacum guatemalense** Planch., Guatemalan, was planted at the Experiment Station, Mayaguez, in 1921, but had made slow growth, being only about 3.5 m. high in 1926. It is a small tree the leaves with 8-12 narrowly oblong leaflets, the fruit obovate.

Vol. V, p. 441, **Stigmaphyllon puberum**, add note. A barren specimen, apparently this species, was collected at the Playa de Humacao, Porto Rico, April 2, 1926 (*Gleason and Cook T. 8*).

Vol. V, p. 444, **Malpighia Shaferi**, add locality, coastal thickets, Maunabo, Porto Rico (*Gleason and Cook, S. 65*, 1926).

Vol. 4, p. 456, **Citrus aurantifolia**, add synonym, *Citrus javanica* Blume, Bijdr. 140. 1825.

Vol. V, p. 457, add **Citrus mitis** Blanco, SCARLET LIME, CALAMONDIN, of southeastern Asia and the Philippine Islands, is recorded by Mr. Barrett as introduced about 1911, and now grown near Guanajibo, Porto Rico.

Several hybrids of **Citrus** species were established at the Trujillo Plant Propagation Station in 1925.

Citrus longispina Wester, TALAMISAN, Philippine, grown at the Trujillo Plant Propagation Station in 1925, is a thorny shrub about 5 m. tall, the crenate

leaves elliptic to ovate, 6.5-10 cm. long, the petioles narrowly winged. the subglobose fruit about 5.5 cm. in diameter with a lemon colored rind.

Citrus hystrix DC., KABAYAO, widely distributed in the Philippines, British India and Malaya, introduced at the Trujillo Plant Propagation Station in 1925, becomes a shrub up to 4 m. or more in height, the ovate elliptic or lanceolate leaflet equalling or smaller than the very broad petiole, the small white flowers in axillary clusters, the fruit globose or obovoid.

Fortunella Hindsii (Champ.) Swingle, KUMQUAT DE HONGKONG, Chinese, planted at the Trujillo Plant Propagation Station in 1925, is a spiny shrub or small tree, the dark green ovate-elliptic leaves tapering sharply at both ends, the subglobose orange red fruits about 2 cm. in diameter. [*Sclerostylis Hindsii* Champ.]

Vol. V, p. 457, add **Fortunella japonica** (Thunb.) Swingle, ROUND KUMQUAT, of eastern Asia, occasionally planted in Porto Rico, has globular fruit about 2.5 cm. in diameter, the style deciduous. [*Citrus japonica* Thunb.]

Vol. V, p. 457, at end of Rutaceae, add **Severinia buxifolia** Tenore, Chinese, a shrub with simple obovate leaves about 3 cm. long, the small white flowers axillary, the fruit a black berry, was planted at the Trujillo Plant Propagation Station in 1924, and appeared vigorous in 1926.

Chaetospermum glutinosum (Blanco) Swingle, TABOG, native of the Philippines, seen at Villa Leon, near Bayamon in 1925, is a slender glabrous spiny tree, 5-10 m. high, the leaves trifoliolate, the small fragrant flowers white, the oblong fruit about 10 cm. long. [*Limonia glutinosa* Blanco.]

Belou Marmelos (L.) W. F. Wight, BAEL FRUIT, East Indian, reported by Mr. Otis W. Barrett as introduced into Porto Rico, is similar to the Tabog, but has a spherical or pyriform fruit with a hard woody rind.

Vol. V, p. 457, under **Clausena lansium**, add, also planted at the Experiment Station, Mayaguez where a large tree was seen in 1926.

Atalantia citrioides Pierre, LIMON DE INDO-CHINA, native of Indo-China, planted at the Trujillo Plant Propagation Station in 1925, becomes a small tree with oval leaves 5-8 cm. long, the subglobose fruit about 2 cm. in diameter with a rough, glandular rind.

Feronella lucida (Scheff.) Swingle, KAVISTA BATU, Javan, also in the collection at the Trujillo Plant Propagation Station in 1925, is a small spiny tree with odd-pinnate leaves, the ovate or obovate coriaceous leaflets shining above, the fragrant white flowers rather large, the globose fruit 5-7 cm. in diameter. [*Feronia lucida* Scheff.]

Microcitrus australasica (F. Muell.) Swingle, FINGER LIME, KUMQUAT DE AUSTRALIA, Australian, received by the Trujillo Plant Propagation Station in 1925, has ovate cuneiform or rhombic leaves 1.5-4 cm. long, the subsessile flowers usually 5-merous, the cylindric-fusiform fruits 6.5-10 cm. long. [*Citrus australasica* F. Muell.]

Feronia Limonia (L.) Swingle, WOOD APPLE, Native of India, Ceylon, and Indo-China, also introduced at the Trujillo Plant Propagation Station in 1925, is a deciduous tree with odd-pinnate leaves, the globose fruits about the size of an orange, the rind hard and woody. [*Schinus Limonia* L.]

Citropsis Schweinfurthii (Engler) Swingle & M. Kellerman, LIMON DE SUDAN, African, introduced in 1925 at the Trujillo Plant Propagation Station, is a spiny shrub or small tree with 3-5-foliolate leaves, the broadly lanceolate leaflets narrowed from the middle to the long cuneate base, the narrowly obovate or elliptic winged petiole 18-35 mm. broad, the flowers in axillary clusters. [*Limonia Schweinfurthii* Engl.]

Casimiroa edulis Llave & Lex., Mexican, grown from seed planted at the Forest Station, Rio Piedras, in March, 1924, has reached a height of 1 m. in February, 1926; it was also grown at the Trujillo Plant Propagation Station. Plants introduced at the Mayaguez Station in 1920, were vigorous in the spring of 1925. It is a tree with palmately 5-foliolate leaves.

Vol. V, p. 464, **Melia Azedarach**, add, a very fine tree, about 15 m. high with trunk about 9 dm. in diameter was observed in April 1925, on the estate of Mr. Harold I. Sewall, at Naguabo, reported by him as grown from seed sown in 1911.

Melia Azadirachta L., East Indian, grown from seed at the Forest Station, Rio Piedras in 1924, was 2 m. high and luxuriant in the spring of 1926. It forms a large tree, its leaves once pinnate, its flowers fragrant.

Vol. V, p. 468, add at end of Meliaceae, **Lansium domesticum** Jack, LANGSAT, East Indian, recently established at the Experiment Station, Mayaguez, and at the Trujillo Station, forms a pinnate-leaved tree, the small flowers spicate, the fruit edible.

Carapa guianensis Aubl., in the collection at the Experiment Station, Mayaguez, introduced from Trinidad in 1904, was about 8 m. high in 1926. It has pinnate leaves, small flowers in large panicles, the globose fruit 6-7 cm. in diameter.

Vol. V, p. 485, **Adenoropium gossypifolium**, add to distribution, Mona (H. E. Anthony, March 1-12, 1926).

Vol. V, p. 485, add **Aleurites trisperma** Blanco, of the Philippine Islands, introduced at the Experiment Station, Mayaguez, in 1909, had formed a tree some 15 m. high in 1926. The leaves are nearly orbicular, entire, cordate or truncate at base, 8-20 cm. broad.

Aleurites montana (Lour.) E. H. Wilson, Asiatic, was raised from seed of 1920 at the Mayaguez Station, and was represented there by a tree about 5 m. high in 1926. [*Vernicia montana* Lour.]

Vol. V, p. 497, **Euphorbia Tirucalli** L., MILK-BUSH, of tropical Asia, sent as a cutting to Louisenhøj, St. Thomas, from the New York Botanical Garden in 1923, was well established and had reached a height of about 6 dm. in March 1925. It is a small tree, with many slender cylindric leafless twigs 6-12 mm. in diameter.

Euphorbia macroglypha Lemaire, Madagascan, sent from the New York Botanical Garden late in 1924, to Mr. Antonin Nechodoma at Montflores, Porto Rico, had made good growth there by February, 1925. It is a leafless fleshy plant, much branched, the 3-angled branches deeply undulate on the angles, with short stout spines.

Vol. V, p. 500, **Aklema petiolare**, add note, the bark of the larger trees is very thin, dark brown, shining, readily peeling off in paper-like layers.

Vol. V, p. 506, add **Garcia Mayana** Britton, spec. nov.

A tree, about 12 m. high, the twigs densely tomentose. Leaves oblong to oblong-oblancoate, chartaceous, 10–15 cm. long, 3–5 cm. wide, glabrous and dark green above, pilose-pubescent and light green beneath, the apex short-acuminate, the base obtuse or acutish, the rather stout petioles 1.5–3 cm. long; flowers pinkish, 2.5–3 cm. broad, the tomentose peduncles about 2 cm. long; petals narrowly linear, about 13 mm. long; fruit obtusely 3-lobed, 2.5 cm. high, 3–4 cm. broad, densely tomentulose, elastically dehiscent; seeds globose, 1.5 cm. in diameter. Planted at the United States Agricultural Experiment Station, Mayaguez, Porto Rico, the origin of the tree not recorded. Type specimens collected May 10, 1925 (*Britton and Boynton 8331*).

This differs from *Garcia nutans* Rohr, native of tropical America, the only species of the genus hitherto described, by its densely tomentose twigs, its narrower leaves persistently pubescent beneath, narrower and longer petals, and larger fruit and seeds. We take pleasure in naming it in honor of Mr. D. W. May, for many years director of the Mayaguez Experiment Station, distinguished for his services to tropical agriculture, horticulture and husbandry.

Vol. V, p. 506, add, at end of Euphorbiaceae, **Antidesma Bunias** Spreng., East Indian, seen at Villa Leon, near Bayamon, and also introduced at the Mayaguez Experiment Station, is a tree, with lanceolate glabrous leaves, the small dioecious flowers spicate, the subglobose black drupaceous fruit about 8 mm. in diameter.

Vol. V, p. 511, **Spondias dulcis**, for Frost, read Forst.

Schinus terebinthifolius, add, introduced at the Mayaguez Station in 1925.

Schinus molle L., CALIFORNIAN PEPPER-TREE, South American, was seen in the collection at Louisenhøj, St. Thomas, as a young plant in 1925, and was also grown experimentally at the Forest Station, Rio Piedras. It forms a small tree, with drooping branches, the pinnate leaves with many narrow leaflets 2–5 cm. long, the numerous small yellowish flowers in terminal panicles.

Vol. V, p. 515, add 8. **Ilex Cookii** Britton & Wilson, sp. nov.

A much-branched shrub, up to about 1.5 m. high, the twigs angled, somewhat puberulent. Leaves elliptic-oblong, subcoriaceous, 2.5–4.5 cm. long, 1–1.8 cm. wide, entire, glabrous, dark green and lustrous above, paler beneath, the apex acute or acuminate, the base narrowed or rounded, the petioles 2–3 mm. long; fruits (immature) solitary or two together, globose, 4 mm. in diameter, the pedicels 4 mm. long.

Summit of the lower peak of Cerro de la Punta, Porto Rico, 1320 m. altitude, March 18, 1926 (*Gleason and Cook P. 19*).

Vol. V, p. 515, **Cyrilla racemiflora** add note, becomes a large tree in the Luquillo Mountains, there called COLORADO.

Vol. V, p. 517, add 1a. **TORRALBASIA** Krug & Urban; Segui, Med. y Tox. Cuba 60. 1900.

Shrubs or small trees, with small alternate opposite or subopposite, coriaceous or subcoriaceous leaves, and small whitish flowers. Inflorescence axillary, cymose. Calyx 4-lobed. Disk short, cup-shaped. Petals 4. Stamens 4, inserted on the margin of the disk. Ovary 4-celled; styles 4. Capsule coriaceous. [Commemorates Dr. Jose I Torralbas, a Cuban botanist.] Two known species of tropical America, the following typical.

1. **Torralbasia cuneifolia** (C. Wright) Krug & Urban; Segui, loc. cit. 1900.

Euonymus cuneifolius C. Wright; Griseb. Mem. Am. Acad. II. 8: 171. 1860.

Maytenus cuneifolius Griseb. Cat. Pl. Cub. 54. 1866.

A glabrous shrub or small tree, up to 2 m. tall, with grayish-black angular twigs. Leaves obovate to oblong, 2.5–5 cm. long, 0.9–2 cm. wide, entire or somewhat crenulate, the margin revolute; inflorescence 1–2 cm. long; pedicels 2–3 mm. long; sepals suborbicular; petals orbicular or suborbicular, 1–1.5 mm. broad; filaments subulate; capsule 5–6 mm. long.

Summit of the lower peak of Cerro de la Punta, Porto Rico, March 18, 1926 (*Gleason and Cook P. 12; P. 35; P. 55*).

Vol. V, p. 530, add at end of Sapindaceae, **Nephelium mutabile** Blume, BULELA, Bornean, grown at the Trujillo Plant Propagation Station in 1926, becomes a tree up to about 12 m. in height, the pinnate leaves with 2 to 4 pairs of elliptic leaflets 5–12 cm. long, glaucous and silky beneath, the apetalous small flowers racemose, the globose fruit red, sometimes 2-lobed, about 3 cm. long, irregularly tubercled.

Euphoria didyma Blanco [*E. cinerea* Radlk.] seen in 1926 as a tree about 15 m. high in the collection at the Mayaguez Experiment Station, has pinnate leaves, the oblong-lanceolate, acuminate leaflets 6–10 cm. long, the small flowers densely paniced, the verrucose fruit about 1 cm. in diameter or larger.

Euphoria Longana Lam. [*Nephelium Longana* Camb., *Dimocarpus Longan* Lour.], LONGAN, East Indian, was recently planted at the Mayaguez Station, where it had reached a height of 3 m. in the spring of 1926. It is a pinnate-leaved tree of medium size, the leaves with 2–5 pairs of elliptic-lanceolate leaflets, the small paniced petaliferous flowers yellowish-white, the globose fruit 2–2.5 cm. in diameter, thin-shelled, low-tuberculate or nearly smooth, its pulp white.

Pometia tomentosa Kurz, East Indian, was recently grown from seed at the Mayaguez Station, reaching a height of 2 m. in 1926. It is a pinnate-leaved tree, the foliage and inflorescence more or less pubescent, the small white flowers racemose or paniced, the subglobose fruit 3–5 cm. in diameter.

Litchi Litchi (Lour.) Britton, LEE-CHEE, occasionally grown in Porto Rico, is a tree, its leaves with two pairs of sessile ovate leaflets 6–12 cm. long, its small apetalous whitish fragrant flowers in large panicles, its subglobose fruit about 2.5 cm. in diameter, with a thin rough shell enclosing delicious pulp. [*Dimocarpus Litchi* Lour.; *Nephelium Litchi* Camb.]

Vol. V, p. 534, add **Sarcomphalus Taylora** Britton, Bull. N. Y. Bot. Gard. 3: 445. 1905.

A densely branched shrub, 2 m. high or less, or a small tree, the bark gray, the angled twigs unarmed or occasionally with a spine 1–2 cm. long. Leaves obovate, bright green on both sides, 1.5–2.5 cm. long, 2 cm. wide or less, emarginate or rounded at the apex, narrowed at the base, 3-nerved; petioles 2 mm. long; flowers green, 3 mm. broad, the pedicels 2 mm. long; calyx-lobes ovate; petals about as long as the calyx-lobes; ovary oblong; fruit oblong, about 8 mm. long.

Occasional on the coastal plain, Mona:—Bahamas.

Vol. V, p. 538, add at end of Rhamnaceae, **Maesopsis berchemioides** Engler, MISIRI, native of Uganda, grown from seed in 1924, at the Forest Station, Rio Piedras, Porto Rico, had reached a height of nearly 3 m. in March 1926, and appeared luxuriant. It is a tree with ovate-lanceolate, serrate acuminate leaves 6–10 cm. long.

Vol. V, p. 539, add, many kinds of grapes were experimentally grown at the Insular Experiment Station, Rio Piedras, 1924-1925, under the direction of Mr. J. P. Griffiths, Horticulturist.

Vol. V, p. 541, add at end of Vitaceae, **Ampelocissus Martini** Planch. БИКА, of Cochin China, was seen as a young plant at the Insular Experiment Station, Rio Piedras, in February, 1925. It is a vine, with cordate leaves, the 2-3-seeded berry about 1.5 cm. in diameter.

Vol. V, p. 542, add at end of Elaeocarpaceae, **Elaeocarpus dentatus** (Forst.) Vahl, native of New Zealand, was seen as luxuriant young plants 1.5 m. high at the Forest Station, Rio Piedras in 1926. It forms a tree, with coriaceous serrate oblong-ob lanceolate leaves, the fruit a small oblong drupe.

Elaeocarpus siamensis Craib, native of Siam, planted at the Agricultural Experiment Station, Mayaguez, in 1922, was vigorous and about 4 m. high in April, 1926, and was also successfully grown at the Forest Station, Rio Piedras. It is a small tree, with lanceolate acuminate glandular-serrate leaves, the small white flowers racemose.

Vol. V, p. 544, add **Corchorus olitorius** L., CORETTE, East Indian, grown from seed at the Trujillo Plant Propagation Station in 1925, is a slender annual herb with ovate serrate leaves, each of the two lowest teeth filiform-appendaged, the nearly cylindric beaked capsule 3-6 cm. long.

Vol. V, p. 545, add at end of Tiliaceae, **Berria Ammonilla** Roxb., East Indian, grown from seed at the Forest Station, Rio Piedras in 1924, was about 3 dm. high in May 1925. It is a large tree with cordate entire, long-petioled leaves, the small white flowers racemose, the fruit a 6-winged capsule.

Vol. V, p. 548, add **Abutilon mollissimum** (Cav.) Sweet, South American, seen in cultivation at Anna's Hope, St. Croix, in 1925, is a shrub about 1.5 m. high, the branches and petioles long-pilose, the thin, ovate-orbicular, cordate leaves stellate-tomentose beneath, the yellow axillary flowers about 2 cm. broad. [*Sida mollissima* Cav.]

Vol. V, p. 551, **Sida erecta**, add to distribution, St. Thomas.

Vol. V, p. 551, **Sida ciliaris**, add synonyms:

Sida bellidifolia Gandoger, Bull. Soc. Bot. France 71: 629. 1924.

Sida ononidifolia Gandoger, loc. cit. 629. 1924.

Sida microtricha Gandoger, loc. cit. 629. 1924.

Vol. V, p. 552, **Sida carpinifolia**, add synonyms:

Sida crassa Gandoger, Bull. Soc. Bot. France 71: 628. 1924.

Sida malifolia Gandoger, loc. cit. 629. 1924.

Sida jamaicensis, add synonyms:

Sida Eggersii Gandoger, loc. cit. 630. 1924.

Sida densiuscula Gandoger, loc. cit. 630. 1924.

Sida rhombifolia, add synonym:

Sida nudata Gandoger, loc. cit. 632. 1924.

Vol. V, p. 566. **Montezuma speciosissima**, add, grown by Mr. Fairchild at Louisenhøj, St. Thomas, in 1926, from seed collected at Mayaguez, Porto Rico.

Vol. V, p. 568, add at end of Malvaceae, **Malvaviscus grandiflorus** H.B.K., Mexican, seen as a luxuriant plant, 4 m. high, at the Trujillo Plant Propagation Station in April 1926, is a nearly glabrous shrub, with ovate acuminate leaves, and axillary scarlet flowers 6–7 cm. long, the fruit berry-like.

Vol. V, p. 570, add a species of **Pachira** seen as an elegant tree about 10 m. high, on the estate of Peter J. Kane, Rio Piedras, in 1926, has large long-petioled, palmately 7-foliolate leaves, the sessile obovate, strongly pinnately veined leaflets 1–3 dm. long, the base cuneate, the apex broadly emarginate, the upper side glabrous, the under side softly pubescent; its showy flowers are 1.5–2 dm. long, with very numerous stamens.

Vol. V, p. 570, add at end of Bombacaceae, **Durio zibethinus** L., DURIAN, East Indian, introduced in 1920 at the Mayaguez Experiment Station, had reached about 4 m. in height in 1926, it is a tall tree with entire oblong leaves, large, nearly white flowers in lateral clusters, the highly prized globose prickly fruit 1.5–2.5 dm. in diameter, its strongly malodorous pulp edible. An old tree is reported by Mr. Barrett on the estate of Mr. Bartholemew, near Arecibo, seen in the spring of 1926.

Chorisia speciosa St. Hil., Brazilian, was seen as a young tree, at the Trujillo Plant Propagation Station in 1925. It forms a tree about 15 m. high; the leaves are palmately 5–7-foliolate, the oblong leaflets serrate, acute, 6–10 cm. long, the flowers are violet-red, about 15 cm. broad, with 5 petals and 5 stamens, the woody capsule 15–20 cm. long.

Vol. V, p. 574, add **Theobroma pentagona** Bernouilli, CACAO DE NICARAGUA, Central American, was planted at the Agricultural Experiment Station, Mayaguez, in 1909, raised from seed received from Trinidad. Mr. McClelland records the first fruit formed in 1914, and that the vigor of the trees has equalled that of *Theobroma Cacao*.

Theobroma bicolor H. & B., CACAO WARIBA, of Colombia and Central America, was seen as a young plant grown from seed at the Trujillo Plant Propagation Station in 1925; its leaves are dark green above, whitish beneath.

Vol. V, p. 576, **Sterculia apetala**, add, grown from seed at Louisenhøj, St. Thomas, in 1926.

Vol. V, p. 576, add at end of Sterculiaceae, **Kleinhovia hospita** L., of tropical Asia, planted at the Forest Station, Rio Piedras, early in 1924, was about 1.2 m. high in May 1925, and vigorous. It is a tree, with ovate entire acuminate leaves 1.5–3 dm. long, the rose-colored flowers cymose, the fruit an inflated capsule.

Dombeya calantha K. Schum., of tropical Africa, seen in flower at the Trujillo Plant Propagation Station in April, 1925, is a small tree, with large nearly orbicular, cordate, lobed and dentate leaves, the showy rose-colored flowers about 4 cm. broad, in short broad panicles.

Cola vera K. Schum., COLA-NUT of tropical Africa, was grown from seed of 1920 at the Experiment Station, Mayaguez, had reached a height of about 3 m. in April 1926. It is a small tree with obovate acuminate leaves, the small yellow

flowers in axillary clusters, the large follicular fruit 12–15 cm. long, the seeds rich in caffeine. It has also been raised from seed at the Trujillo Plant Propagation Station.

Vol. V, p. 577, at end of Dilleniaceae, add **Actinidia arguta**, Miquel, of northeastern Asia, a woody vine with alternate serrate elliptic leaves, the small white flowers in cymes, the fruit a yellowish berry, experimentally introduced at the Trujillo Plant Propagation Station in 1924, had attained a length of 5 dm. in April, 1926.

Vol. V, p. 580, **Taonabo peduncularis**, add note, a barren specimen, apparently of this species was obtained by *Gleason and Cook* in the forest at La Sardinera, near Dorado, in March, 1926.

Vol. V, p. 582, at end of Theaceae, add, **Thea sinensis** L., TEA, Asiatic, has occasionally been planted in Porto Rico. An old bush, about 8 dm. high, apparently healthy, was seen at Villa Leon, near Bayamon, in 1925. It is a shrub, with elliptic dentate leaves 6–12 cm. long and white fragrant flowers 3–4 cm. broad.

Vol. V, p. 584, add **Calophyllum Inophyllum** L., East Indian, seen as a young tree in a garden at Condado, Porto Rico, in 1925, has leaves similar to those of *C. antillanum*, but larger, the fruit also larger, short-pointed.

Vol. V, p. 586, add **Garcinia Mangostana** L., MANGOSTEEN, East Indian, has been successfully established at the Agricultural Experiment Station, Mayaguez, Porto Rico, where two luxuriant trees, introduced in 1903, about 6 m. high, were seen in 1926. It has yellowish twigs, stout-petioled elliptic many-veined acuminate leaves 1.5–2.5 dm. long, the purplish flowers about 3 cm. broad, the ovoid purplish highly esteemed fruit 5–8 cm. long, the large calyx persistent. These trees have borne fruit for several years.

Garcinia spicata, add, a young plant grown under this name at the St. Croix Experiment Station, seen in 1925, was not vigorous. Five other species of **Garcinia** planted there recently had failed to grow, indicating that the climate is too dry for trees of this genus.

Garcinia celebica, add, the trees grown by Mr. Sewall at Naguabo, had reached a height of 5 m. in April, 1925; they bloom profusely, the nearly white flowers about 3 cm. broad, but they had not produced any ripe fruit; the immature fruit was ovoid, about 3 cm. long, the calyx persistent. As noted by Mr. Sewall the leaves of this tree are relatively thin, and the venation is not prominent.

Garcinia Benthami, add, the leaves of this species are thin, delicately veined, the veins ascending, the fruit small, sessile, the branches slightly drooping; the depressed-globose fruit is about 4 cm. in diameter; add the common name BUNAC.

Garcinia indica (Thouars) DC., East Indian, planted at the Mayaguez Experiment Station in 1903, luxuriant in clumps 5 to 6 m. high there in 1926, is a densely leafy, ornamental small tree, its leaves oblong-obovate, acute, 6–8 cm. long, red when young, its purple smooth subglobose fruit 2–3 cm. in diameter. [*Brindonia indica* Thouars.]

Garcinia tinctoria (DC.) Dunn. East Indian, grown by Mr. Sewall at Naguabo, and seen also at Villa Leon, near Bayamon, is a tree 5–10 m. high, with

large leathery, oblong to elliptic, short-acuminate leaves 2.5–4.5 dm. long, the white flowers about 2 cm. broad, the globose pointed yellow fruit about 8 cm. in diameter. [*Xanthochymus tinctorius* DC.; *G. Xanthochymus* Hook.f.]

Garcinia cambogia Desv., East Indian, seen at Villa Leon, near Bayamon in 1926, as a tree about 12 m. high, has elliptic to elliptic-obovate chartaceous leaves 6–10 cm. long, narrowed at base and short-petioled, the venation ascending; the short-peduncled flowers are terminal and axillary, about 15 mm. broad; the fruit of this tree is described as yellow or red, the size of a small apple.

Garcinia binucao (Blanco) Choisy, of the Philippine Islands, a small elegant tree, about 7 m. high or higher, with nearly horizontal or somewhat drooping branches, seen in several Porto Rican gardens, has elliptic, slender-petioled, rather inconspicuously veined leaves 6–10 cm. long, the red flowers about 1 cm. broad, the sessile globose inedible fruit 5–8 cm. in diameter. [*Cambogia binucao* Blanco; *Garcinia duodecandra* Pierre.]

A species of **Garcinia**, seen at Villa Leon, near Bayamon, Porto Rico, in 1925, as a fine tree about 5 m. high, has shining leathery elongated oblong, sharply acuminate leaves about 3 dm. long and 9 cm. wide, the lateral venation widely ascending; the subglobose pointed fruit is 4–5 cm. in diameter, borne on a stalk about its length.

Pentadesma butyracea Sabine, TALLOW-TREE, native of tropical Africa, recently introduced at the Trujillo Plant Propagation Station and at several Model Farms in Porto Rico, forms a tree, with leathery oblong leaves, large flowers with many stamens, the baccate fruit about 1 dm. long.

Mesua ferrea L., East Indian, a beautiful tree about 8 m. high, seen at Villa Leon, near Bayamon, in 1925, has lanceolate acuminate coriaceous short-petioled leaves 6–10 cm. long, bright green and shining above, nearly white beneath, the axillary and terminal white flowers are short-peduncled, the sepals and petals 4; the ovoid fruit is hard, containing 1–4 dark brown seeds.

Rheedia lateriflora L., an evergreen tree of Trinidad and northern South America, seen at Villa Leon near Bayamon in 1925, is 6–10 m. high, the coriaceous oblong short-petioled leaves 1–2 dm. long, with numerous approximate transverse veins, the pedicelled flowers fascicled in the twigs, the yellowish drupaceous fruit ovoid.

Vol. V, p. 587, **Tamarix articulata**, add, grown also at the Mayaguez Experiment Station.

Vol. V, p. 596, **Flacourtia Ramontchi**, the older name is **Flacourtia indica** (Burm. f.) Merrill.

Vol. V, p. 597, **Taraktogenos Kurzii**, add, many young trees were seen at the Forest Station, Rio Piedras, in March, 1926, introduced in 1924, having grown luxuriantly, reaching 1 m. in height; it was also introduced in 1925 at the St. Croix Experiment Station.

Vol. V, p. 597, add **Doryalis caffra** (Harv. & Sonder) Warb., KEI APPLE, South African, a thorny shrub or small tree, with obovate leaves about 5 cm. long, the axillary small flowers dioecious, the bright yellow pulpy fruit 2–3 cm. in diameter, was luxuriant in 1926, at the Agricultural Experiment Station, Mayaguez, and at the Plant Propagation Station, Trujillo. A vigorous old plant, 2 m. high was seen at the St. Croix Experiment Station. [*Aberia caffra* Harv. & Sonder].

Doryalis hebecarpa Warburg, KETEMBILLA, introduced at the Mayaguez Station and also at the Trujillo Plant Propagation Station, is a shrub or small tree, with acid purplish fruits about 2.5 cm. in diameter.

Vol. V, p. 597, add, at end of Flacourtiaceae, **Oncoba echinata** Oliver, of tropical Africa, seen in 1926 as luxuriant young plants 3.5 m. high at the Trujillo Station, and also recently added to the collection at the Mayaguez Experiment Station, is a shrub with oblong leaves, and small polygamous flowers, the globose densely echinate fruit 2-3 cm. in diameter.

Vol. V, p. 602, after **Passiflora Tulae**, add **Passiflora Murucuja** L. Sp. Pl. 957. 1753.

A slender glabrous vine. Leaves chartaceous, the blades 2.5-8 cm. broad, 1-3.5 cm. long, 3-nerved, 2-lobed, much wider than long, finely reticulate-veined, the lobes often emarginate, the base rounded, broadly cuneate or somewhat truncate, the petioles 5-10 mm. long, slender; peduncles solitary, 2-2.5 cm. long; flowers exinvolucrate; sepals and petals oblong, dull red or somewhat purplish; petals about one-half as long as the sepals; basal crown wanting; styles about 10 mm. long; fruit globose.

Near Quebradillas, Porto Rico (*F. L. Stevens 1818*; mountains between Lares and Arecibo, *H. T. Cowles*, April 1925);—Hispaniola.

Vol. V, p. 606, add **Begonia foliosa** H.B.K., Colombian, a low species with small 2-ranked serrulate leaves, and solitary peduncled flowers, was seen in the collection at Louisenhøj, St. Thomas, in 1925.

A collection of tuberous **Begonias** brought to the Trujillo Plant Propagation Station, flowered well in 1925.

Vol. V, p. 612, add **Opuntia stricta** Haw., of Cuba and Florida, sent from the New York Botanical Garden to Mr. Antonin Nechodoma at Monteflores, Porto Rico, late in 1924, had made good growth there by February, 1925. It is an often spineless species, about 8 dm. high or lower, with oblong or obovate joints 8-15 cm. long, and bright yellow large flowers.

Vol. V, p. 616, **Hylocereus costaricensis** add, sent also to Mr. Antonin Nechodoma at Monteflores, Porto Rico, from the New York Botanical Garden late in 1924, and growing there in February, 1925.

Vol. V, p. 616, add **Hylocereus extensus** (Salm-Dyck) Britton and Rose, also sent to Mr. Nechodoma from the New York Botanical Garden in 1924 had made good growth by February, 1925. This is a long climbing 3-angled cactus, the large flowers described as rose-red; the plant from which the cutting was taken has not bloomed under glass in New York; it was grown from a cutting received several years ago from the Berlin Botanical Garden. The species is recorded as native of Trinidad, but this is not certainly known.

Vol. V, p. 617, **Selenicereus Boeckmanni** add, also grown by Mr. Nechodoma at Monteflores, from the New York Botanical Garden in 1924.

Vol. V, p. 617, add **Selenicereus Donkelaarii** (Salm-Dyck) Britton and Rose, of Yucatan, also sent from the New York Botanical Garden to Monteflores, late in 1924, was growing vigorously there in February, 1925. This species has very slender, 9-10-ribbed stems, short weak spines, the flowers about 18 cm. long. [*Cereus Donkelaarii* Salm-Dyck.]

Selenicereus coniflorus (Weingart) Britton and Rose, Mexican, sent to Mr. Nechodoma at the same time, had made some growth in February, 1925. It has long climbing 5–6-ribbed stems, acicular spines 10–15 mm. long, the flowers 2–2.5 dm. long, their outer segments yellow, the inner bright white. [*Cereus coniflorus* Weingart.]

Vol. V, p. 619, add, **Werckleocereus Tonduzii** (Weber) Britton and Rose, of Costa Rica, sent late in 1924 to Mr. Nechodoma at Monteflores, Porto Rico, from the New York Botanical Garden was growing well in February, 1925. This is an epiphytic climbing cactus, with 3-angled branches and white short-funnel-form flowers. [*Cereus Tonduzii* Weber.]

Deamia testudo (Karw.) Britton and Rose, native from Mexico to Colombia, also sent to Mr. Nechodoma from New York in 1924 had made good growth by February 1925. It is an elongated epiphytic climbing cactus with ribbed or winged leafless joints, the elongated funnellform flowers about 2.5 dm. long. [*Cereus testudo* Karw.]

Vol. VI, p. 18, add at end of Melastomaceae, **Melastoma Molkenboeri** Miquel, Javan, grown at the Trujillo Plant Propagation Station in 1926, is a shrub with petioled ovate, 5-nerved, puberulent leaves and showy purple flowers about 5 cm. broad.

Tibouchina semidecandra (Schr. & Mart.) Cogn., Brazilian, also grown at the Trujillo Station in 1925, is a shrub 1–2 m. high, with ovate, densely setose leaves 4–10 cm. long, the large purple, flowers showy, 7–12 cm. broad.

Vol. VI, p. 23, **Terminalia Catappa**, add note, a tree nearly 30 m. high was observed near Las Cruces, Porto Rico, in 1926.

Vol. VI, p. 23, after **Terminalia Catappa**, add **Terminalia Arjuna** Bedd., East Indian, seen as a fine tree at Villa Leon, near Bayamon, Porto Rico, in 1925, has opposite oblong obtuse leaves, 8–15 cm. long, small flowers in paniced spikes, the 4–5-winged fruit about 5 cm. long.

Terminalia myriocarpa van Heurck and Muell., East Indian, introduced at the Mayaguez Experiment Station in 1923, was vigorous and 4–7 m. high in the spring of 1926. It is a tree, with lanceolate pubescent leaves 6–15 cm. long, small spicate-paniced flowers, the 5-winged fruit small, about 4 mm. long.

Terminalia angustifolia Jacq. [*T. Benzoin* L.f.], native of the Malayan Islands, germinated at the Forest Station, Rio Piedras in 1925 from seed planted in December, 1924, and trees about 2 m. high were thrifty there in December, 1925. It is a tree with linear-lanceolate leaves, the flattened fruit winged.

Vol. VI, p. 32, add note. A barren specimen collected near the summit of Cerro de la Punta (*Gleason and Cook P. 73*), with rhombic-obovate, pale green, coriaceous leaves 3–4 cm. long, obtuse at apex, narrowed at the nearly sessile base, may represent another species of *Calyptanthus*.

Vol. VI, p. 38, **Eugenia cordata**, add locality, in forest, Playa de Ceiba, eastern Porto Rico (*Gleason and Cook, 1926*).

Vol. VI, p. 40; under **Eugenia xerophytica**, add to distribution, limestone hill, Salinas de Guanica, barren, the flowers and fruit still unknown.

Vol. VI, p. 42, **Anamomis fragrans**. The Fajardo plant referred to, as yet known only from the original barren specimens, has been indicated as a distinct species, **Eugenia fajardensis** Urban, Symb. Ant. 9: 109. 1923.

In coastal woods, at La Sardinera near Dorado, a very large tree was observed in 1926, barren during February and March. It is about 25 m. high, with smooth, light-colored trunk and branches, its leaves like those of *Anamomis fragrans*; its local name is PIMIENTO AMARGO.

Vol. VI, p. 42, under **Syzygium jambolanum**, the older name is **Syzygium Cumini** (L.) Skeels. [*Myrtus Cumini* L.] It was introduced at the Mayaguez Experiment Station in 1920, and in April 1926 was about 2 m. high and vigorous.

Vol. VI, p. 43, add at end of Myrtaceae, **Rhodomyrtus tomentosa** (Ait.) Wight, DOWNY MYRTLE, East Indian, occasionally planted in Porto Rico for its edible fruit, is a tomentose shrub, the elliptic leaves 2.5–6 cm. long, the rose-colored flowers axillary, the berries about 1 cm. in diameter. [*Myrtus tomentosa* Ait.]

Melaleuca Leucodendron L., CAJUPUT TREE, seen as fine trees about 20 m. high at the Mayaguez Experiment Station, has pale yellow bark which separates in very thin layers, alternate oblong leaves 5–10 cm. long, narrowed at both ends, the white or purplish flowers spicate. This tree is recorded as withstanding salt water.

Myrciaria cauliflora Berg, JABOTICABA, Brazilian, grown at the Insular Experiment Station, Rio Piedras, is a small tree, with pointed elliptic-lanceolate leaves, the short-pedicelled flowers borne on the trunk and branches, the globose purple edible fruit about 2 cm. in diameter.

Syncarpia laurifolia Tenore, Australian, grown at the Forest Station, Rio Piedras, from seed of 1924, had attained a height of about 1.5 m. by December, 1925. It forms a slender tree with ovate to elliptic leaves, the flowers in globose heads.

Caryophyllus aromaticus L., CLAVO DE ESPANO, CLOVE, native of the Molucca Islands, was seen as a young plant at the Trujillo Plant Propagation Station in 1925. It is a small tree, with glabrous petioled oblong-elliptic leaves 8–12 cm. long, the cymose purplish flowers 6–8 mm. broad.

Vol. VI, p. 43, after **Couroupita** add **Grias cauliflora** L., PERA DE ANCHOA, ANCHOVY PEAR, Jamaican, of the family **Lecythidaceae**, grown at the Trujillo Plant Propagation Station in 1925, forms a tree 5–10 m. high, the very large oblong-lanceolate leaves up to 1 m. long, clustered at the ends of the branches; the large white flowers, and the fleshy edible drupaceous fruits which are about 6 cm. long, are borne on the sides of the branches or on the trunk.

Lecythis Zabucajo Aubl., PARADISE NUT, NUEZ DE PARADISO, native of Guiana, as a related species, grown from seed in 1924 at the Trujillo Station, and about 1 m. high in 1926, is a tree with oblong-lanceolate leaves, the flowers in terminal racemes, the woody circumscissile capsule about 10 cm. long, the seeds delicious.

Barringtonia asiatica (L.) Kurz, East Indian, also of the **Lecythidaceae**, planted in 1922 at the Mayaguez Experiment Station, was about 1.5 m. high and vigorous in April 1925. It is a tree, with large obovate leaves, racemose large white flowers, the 4-sided fruit about 8 cm. broad. [*Mammea asiatica* L.]

Vol. VI, p. 44, **Cassipourea alba**, add note, recent study of this genus by Mr. A. H. G. Alston (Kew Bull. 1925: 267) indicates that this species is not distinct from **C. elliptica** (Sw.) Poir., its older name. Its geographical range extends to Cuba, Jamaica and Central America.

Vol. VI, p. 48, add 2. **Didymopanax Gleasonii** Britton & Wilson, sp. nov. A densely leafy shrub, 1.5 m. high, the branches glabrous. Leaves clustered at the end of the branches, densely canescent when young, glabrous or nearly so in age; petioles slender, terete, 5–7 cm. long; leaflets 3–5, their petiolules 5–8 mm. long; blades oblong-obovate, 3–5.5 cm. long, 1.2–2 cm. wide, rounded at the apex, faintly pinnately veined, subcoriaceous, entire, buds obovoid, canescent; stamens 5.

Between the peaks of Cerro de la Punta, Porto Rico, 1300 m. altitude, in bud, March 18, 1926. (Gleason and Cook P. 60, type; P. 21.)

Vol. VI, p. 53, **Cerefolium Cerefolium**, add, occasionally grown in Porto Rico.

Vol. VI, p. 53, at end of Ammiaceae, add **Hipposelinum Levisticum** (L.) Britton & Rose, LOVAGE, of southern Europe, grown in 1925 at the Trujillo Plant Propagation Station, is a tall glabrous plant, the large decompound leaves with ovate or oblong, toothed cuneate segments, the umbels of yellowish-white flowers 5-8 cm. broad, the small fruits ovate-oblong. [*Ligusticum Levisticum* L.; *Levisticum officinale* Koch.]

Chaerophyllum bulbosum L., also of southern Europe and grown at the Trujillo Station in 1925, is biennial, 1-2 m. high, the root bulbiform, the leaves finely dissected, the narrowly linear-oblong fruit 6-7 mm. long.

Myrrhis odorata (L.) Scop. [*Scandix odorata* L.], MIRRA DE JARDIN, SWEET CICELY, European, experimentally grown in 1925, for seasoning, at the Trujillo Station, is perennial, 5-10 dm. high, with large soft pinnatisect leaves, the umbels of white flowers pubescent, the linear-oblong fruit 2-3 cm. long.

Vol. VI, p. 54, in key read under

Ovary Inferior

Anthers distinct.

Stamens as many as the corolla-lobes or twice as many. Order 7. RUBIALES.

Stamens fewer than the corolla-lobes.

Order 8. VALERIANALES.

Anthers united (except in Ambrosiaceae).

Order 9. CAMPANULALES.

Vol. VI, p. 55, after **Xolisma Stahlia**, add note. Barren specimens, apparently representing another species of *Xolisma*, were collected on the Cerro de la Punta, near Jajuya, March 18, 1926 (*Gleason and Cook P. 22, P. 26*); the leaves are elliptic, 2.5-4 cm. long, coriaceous and obscurely veined when old, the apex obtuse or acutish, the base obtuse or rounded, the petioles 2.5-4 mm. long.

Vol. VI, p. 59, **Petesioides yunqueense**, add, fruit depressed-globose, 7 mm. in diameter.

Vol. VI, p. 62, add **Clavija longifolia** (Jacq.) Mez., South American, was seen as a young plant at the Trujillo plant Propagation Station in March, 1926. It is a peculiar tree, with large oblong spinulose-dentate leaves 2-5 dm. long, tufted at the ends of the slender branches, the small 5-parted flowers in slender racemes, the globose drupaceous fruit about 2 cm. in diameter. [*Theophrasta longifolia* Jacq.; *C. ornata* D. Don.]

Vol. VI, p. 67, **Lucuma macrocarpa**, add, grown also at the Mayaguez Experiment Station.

Lucuma nervosa A. DC., CANISTEL, EGG-FRUIT, Cuban, a tree introduced into Porto Rico for its edible fruit, has rather thin elliptic leaves and a globose berry, 5-6 cm. in diameter, the dry pulp sweet.

Vol. VI, p. 71, **Bumelia Krugii**, add note, flowers white, fragrant.

Vol. VI, p. 72, under **Manilkara nitida**, add Porto Rican name AUSUBO.

Vol. VI, p. 72, add **Manilkara emarginata** (L.) Britton & Wilson.

Sloanea emarginata L. Sp. Pl. 512. 1753.

Mimusops emarginata Britton, Torreya 11: 129. 1911.

A tree, up to 10 m. high, the trunk sometimes 3 dm. in diameter, the twigs stout, the young foliage finely pubescent. Leaves oblong, 3-10 cm. long, emarginate at the apex, narrowed or rounded at the base, glabrous or nearly so when old, the petioles 1-2 cm. long; flowers on tomentose nodding pedicels 1-3 cm. long; sepals tomentose, lanceolate; corolla 1.5-2 cm. broad, light yellow, its

linear lobes often toothed at the apex; appendages similar to the corolla-lobes, about one-half their length; staminodia triangular; berry depressed-globose, nearly 3 cm. in diameter, scaly.

Between Lajas and Parguera, southwestern Porto Rico (*H. T. Cowles 1189*, collected March 1926, the specimen in young fruit):—Florida; Bahamas; Cuba. **WILD DILLY.**

Vol. VI, p. 72, add **Mimusops marginata** N. E. Brown, of Natal, introduced at the Mayaguez Experiment Station in 1922, grew slowly, being only about 6 dm. high in the spring of 1926.

Mimusops Elengi, add, recently introduced into Porto Rico, from seed.

Vol. VI, p. 72, add at end of Sapotaceae, **Imbricaria coriacea** D.C., Madagascar, shown by a fine tree about 10 m. high in the collection at the Mayaguez Experiment Station, studied in 1926, has milky sap, alternate coriaceous obovate leaves 7–12 cm. long, solitary axillary long-peduncled greenish flowers about 2 cm. broad, the corolla many-parted into narrow segments, the pendulous smooth globular fruit 3–4 cm. in diameter.

Vol. VI, p. 74, under **Diospyros ebenaster**, add, abundant in coastal woods, Sardinera, 1926, the trees up to 20 m. high, with trunks 4 dm. in diameter somewhat buttressed at the base, the dark brown bark separating in long thin strips.

Diospyros Kaki L.f., CHINESE PERSIMMON, native of China, was experimentally introduced in 1924 at the Trujillo Plant Propagation Station, and had made slow growth by April 1926. It is a tree of medium size, with elliptic to obovate leaves, pubescent beneath, the orange or red edible fruit 3–7 cm. in diameter.

Vol. VI, p. 80, add **Jasminum humile** L. [*J. revolutum* Sims], Asiatic, a vine-like shrub, with alternate pinnate leaves and large bright yellow flowers, was introduced at the Trujillo Station in 1924, and appeared luxuriant in April 1926.

Jasminum primulinum Hemsl., Chinese, also seen at the Trujillo Station in 1925, luxuriant, about 1 m. long, has opposite 3-foliolate leaves, the yellow flowers 3–5 cm. broad, with foliaceous calyx-lobes.

Vol. VI, p. 81, under **Olea europaea**, add, recently planted at the Mayaguez Experiment Station; young trees 6–15 dm. high, appeared not very vigorous in 1926. Add Spanish name **ACEITUNA**.

Vol. VI, p. 81, add at end of Oleaceae, **Ligustrum amurense** Carr., PRIVET, Chinese, occasionally and successfully grown for hedges in moist parts of Porto Rico, is a shrub, with upright slender pubescent branches and small oval-oblong obtuse leaves. Its flowers are small, white, in nodding panicles; we have not seen this shrub in bloom in Porto Rico, and the specific determination is from foliage only.

Vol. VI, p. 82, add, at end of Loganiaceae, **Gelsemium sempervirens** Ait.f., CAROLINA YELLOW JASMINE, of the southeastern United States, a long woody, vine with cymose yellow flowers, the lanceolate petioled leaves entire, 4–7 cm. long was experimentally introduced at the Insular Experiment Station, Rio Piedras, in 1924.

Buddleia Colvillei Hook. f., of Sikkim, introduced at the Mayaguez Station in 1925, had reached a height of 6 dm. in March, 1926. It forms a small tree, 5–6 m. high, with oblong leaves 10–15 cm. long, the paniced crimson flowers 2.5 cm. long, the corolla tubular-campanulate.

Vol. VI, p. 88, add **Plumiera acuminata** Ait., Mexican, planted at the Agricultural Experiment Station, Mayaguez, Porto Rico, has large oblong glabrous leaves narrowed at both ends, the white corolla with a yellow throat, its lobes longer than the tube. Young trees were about 3 m. high in 1926. [*P. acutifolia* Poir.].

Vol. VI, p. 89, **Catharanthus roseus** add note, a plant several years old observed in the garden at Louisenhøj, St. Thomas in 1925, had very small flowers, the corolla-limb only 1 cm. wide, with acute lobes.

Vol. VI, p. 94, at end of Apocynaceae, add **Acokanthera spectabilis** G. Don, African, a large shrub with elliptic leaves and fragrant white flowers in axillary cymes was sent from the New York Botanical Garden to Louisenhøj, St. Thomas, in 1923; it had made slow growth by March 1925 but was, apparently, established.

Funtumia elastica (Preuss) Stapf, West African, was seen as young plants, 1 m. high, at the Forest Station, Rio Piedras, in 1926, and also as large trees at the Mayaguez Station and at Villa Leon, near Bayamon. This forms a very large tree in its native habitat. [*Kickxia elastica* Preuss.] It has opposite elliptic acuminate leaves 10–15 cm. long, the simple venation ascending. The trees of this genus yield caoutchouc.

A species of **Funtumia**, grown at the Agricultural Experiment Station, Mayaguez, from seed from Mozambique, Portuguese West Africa, received from Mr. O. W. Barrett in 1909, differs from **F. elastica** in its leaves, which are abruptly cuspidate-acuminate, the forked venation rather widely spreading. Several vigorous trees were grown from these seeds which were about 8 meters high in 1926.

Beaumontia grandiflora Wall., East Indian, an elegant woody vine with large elliptic leaves, the large showy and fragrant flowers in terminal cymes, with a white funnelform corolla about 12 cm. long, has occasionally been planted for ornament in Porto Rico.

Vol. VI, p. 102, add at end of Asclepiadaceae, **Ceropegia dichotoma** Haworth, sent to Mr. Antonin Nechodoma's garden, from the New York Botanical Garden in 1924, was growing well in February, 1925. It is an erect fleshy plant, with linear leaves, and yellowish campanulate flowers.

Vol. VI, p. 109, **Exogonium repandum** add note, a specimen sent by His Excellency Captain Philip Williams, U. S. N., Governor of the Virgin Islands, obtained by Dr. Richardson in St. Jan, shows that this vine has a large woody base about 10 cm. long. It is known on St. Jan as MARRON BACOA, a name apparently also applied to *Solanum conocarpum*.

Vol. VI, p. 110, **Exogonium arenarium**, in description read, corolla 3–4 cm. long.

Vol. VI, p. 112, strike out last synonym under **Ipomoea rubra** and add:

4. **Ipomoea palustris** Urban, Symb. Ant. 9: 423. 1925.

Ipomoea rubra palustris Urban, Symb. Ant. 3: 345. 1902.

Stem twining, glabrous, 1–1.5 mm. thick. Leaves cordate or hastate, 3–7 cm. long, 1–3 cm. broad, long-petioled, 5–7-nerved, the nerves prominent on both sides; inflorescence 1-flowered, the peduncles 0.5–8 cm. long; sepals unequal, the exterior ovate-elliptic, 15–17 mm. long, the dorsal 3-winged, the two interior ovate, wingless, 11–12 mm. long, apiculate; corolla rose-purple, 3–3.5 cm. long, the tube subcylindric; capsule subglobose.

Wet meadows, Bayamon, Porto Rico:—Cuba. Similar to *Ipomoea rubra* (Vahl) Millsp., but differing in its narrower leaves, 1-flowered inflorescence and shorter corolla-tube.

Vol. VI, p. 112, ***Ipomaea aegyptia***, add, occasionally planted for ornament in Porto Rico.

Vol. VI, p. 118, ***Operculina tuberosa***, add, forms a beautiful porch-vine in Porto Rico.

Vol. VI, p. 126, add ***Cordia Blancoi*** Vidal, a tree of the Philippine Islands, planted at the Mayaguez Experiment Station in 1920, was about 10 m. high in April, 1926. It has slender-petioled elliptic leaves and paniced whitish flowers.

Vol. VI, p. 130, ***Rochefortia cuneata***, add note. A barren specimen, with foliage much resembling that of this species, but the slender twigs with acicular spines 1 cm. long, was collected at La Sardinera, near Dorado, Porto Rico (*Gleason and Cook* Q. 56).

Vol. VI, p. 137, ***Cochranea anchusaefolia***, add, observed as a waif at San Juan; occasionally grown in Porto Rico flower gardens.

Vol. VI, p. 137, add at end of Boraginaceae, ***Myosotis scorpioides*** L., FORGET-ME-NOT, European, occasional in Porto Rico flower-gardens at middle elevations, and seen also in Mrs. Barcelo's garden near sea-level at Candado, is a low pubescent perennial, with oblong-oblongeolate obtuse leaves 2-7 cm. long, the flowers in 1-sided slender racemes, the corolla about 6 mm. broad, lilac with a yellowish eye.

Vol. VI, p. 138, add ***Verbena hybrida*** Voss., of hybrid origin, seen in a white-flowered form in a mountain garden near Albonito, is prostrate or decumbent, grayish-pubescent, the leaves ovate-oblong, serrate, the flowers corymbose.

Verbena erinoides Lam., MOSS VERBENA, Argentinian, grown in Porto Rico flower-gardens, has partly prostrate stems, rooting at the lower nodes, the leaves pinnatifid, the lilac flowers in short spikes.

Vol. VI, p. 139, ***Ghinia spinosa*** add note, plants nearly leafless, flowering in March, 1925, abundant on limestone hills, Salinas de Guanica; corolla nearly regular, lavender, about 12 mm. broad.

Vol. VI, p. 149, add ***Vitex parviflora*** A. Juss., A tree of the Philippine Islands, grown from seed at the Forest Station, Rio Piedras in 1924, grew to a height of 1.5 m. by February, 1926. It has 3-foliolate leaves and small blue flowers, the globose fruit 5-6 mm. in diameter.

Vol. VI, p. 150, ***Clerodendrum speciosissimum***, add, grown also in St. Thomas gardens.

Vol. VI, p. 151, add ***Clerodendrum speciosum*** Bailey, grown in Virgin Island flower-gardens, is a vine, with foliage similar to that of *C. Thompsonae*, but with smaller flowers, the calyx dull red. It is supposed to be a hybrid between *C. Thompsonae* Balfour and *C. splendens* Don.

Vol. VI, p. 151, add ***Clerodendrum foetidum*** Bunge, Chinese, found by Mr. Otis W. Barrett in June, 1925, growing in a dumping ground west of Vega Alta, presumably as a waif, from some garden, inasmuch as it is sometimes grown for ornament. It is a pubescent shrub 1-2 m. high, with large, broadly ovate, coarsely toothed, long-petioled leaves malodorous when crushed, and reddish flowers numerous in dense corymbs, the corolla about 2 cm. broad.

Clerodendrum nutans Wall., East Indian, grown at the Agricultural Experiment Station, Mayaguez, Porto Rico, and at Louisenhöj, St. Thomas, is a glabrous shrub, with 4-sided branches, oblong-lanceolate acuminate thin leaves 6-20 cm. long, the white flowers in large drooping panicles, the calyx inflated, the corolla 2-3 cm. broad, its lobes nearly as long as the tube.

Vol. VI, p. 152, **Petraea volubilis**, add, the true *P. volubilis*, native of Martinique, is not certainly known to us as existing at present in Porto Rico. A very elegant vine of this species grows luxuriantly, however, at Bluebeard's Castle, St. Thomas. The species commonly planted in Porto Rico is **Petraea Stapelsiae** Paxton, probably South American. It has smaller flowers than those of *P. volubilis*, in shorter clustered drooping racemes; the racemes of *P. volubilis* are solitary.

Vol. VI, p. 152, add at end of Verbenaceae, **Congea tomentosa** Roxb., Burmese, seen at the Trujillo Plant Propagation Station in 1926, is an elegant woody velvety vine, with opposite entire, elliptic-ovate leaves 6-15 cm. long, the small capitate flowers subtended by oblong pink or rose bracts 2-3 cm. long, the clusters arranged in terminal panicles.

Gmelina arborea Roxb., CIRUELA DE MALAYA, grown in 1925 at the Trujillo Plant Propagation Station, is an East Indian tree, with long-petioled cordate leaves 1-2.5 dm. long, panicked yellow nodding flowers, the fruit a small yellow ovoid drupe.

Vol. VI, p. 156, under **Salvia coccinea**, add note, the white-flowered race was found by Alphonse Nelthropp on a slope on the northern side of St. Thomas in 1925 and brought into cultivation at Louisenhøj.

Vol. VI, p. 156, add **Salvia officinalis** L., GARDEN SAGE, European, luxuriant at the Trujillo Plant Propagation Station in April 1925, is perennial, with whitish tomentose foliage, the leaves oblong to lanceolate, the purple or white flower verticillate.

Vol. VI, p. 176. The *Cestrum* described but not named at the bottom of the page may be known as

Cestrum hortulanum Britton & Wilson, n. sp.

A shrub 2 m. high, the slender twigs pubescent. Leaves lanceolate, membranous, glabrous, 3.5-6 cm. long, 1.2-2 cm. broad, acute at the apex, rounded at the base, the petioles slender, 4 mm. long; panicles few-flowered, about as long as the leaves or longer; calyx campanulate, 4 mm. long; corolla white, 2.2 cm. long, its lobes oval, 4 mm. long; filaments edentate.

Garden, in the town, St. Thomas (*Britton and Boynton 290*). In flower, March, 1925; origin unknown.

Vol. VI, p. 183, **Bramia Monnieri** add note, this species or a closely related one was observed in February, 1926, forming dense patches matted in mud on a marshy limestone hillside near Ciales, about 20 kilometers from the northern coast of Porto Rico.

Vol. VI, p. 191, **Setiscapella subulata**, add note. Collected also on the summit of Monte El Yunque (*Gleason*, April 21, 1926). The occurrence of this species and of *S. pusilla* on the top of a high mountain, is of especial interest, both of them being mostly found in wet sandy situations near the coast.

Vol. VI, p. 200, add note, a long puberulent vine of the Bignoniaceae, observed in a hillside forest near Humacao, Porto Rico, barren in February, 1926 (*Britton 8614*), is apparently another native species of this family. It has 4-angled branches, broad membranous 2-divided stipules about 2 cm. wide, petioled 2-foliate leaves, the leaflets broadly ovate, bluntly long-acuminate, subcordate, pinnately veined, the margins erose.

Vol. VI, p. 208, **Nelsonia brunelloides**, add, abundant as a weed in cocal, Playa de Humacao, 1926.

Vol. VI, p. 225, **Clavenna tetrandra**, strike out the word "prostrate," in both generic and specific descriptions. As recently observed in Porto Rico, growing on wet nearly vertical rocks, the plant is nearly erect, but very slender.

Vol. VI, p. 228, add **Exostema ellipticum** Griseb. Mem. Am. Acad. II. 8: 504. 1862.

. A glabrous shrub or small tree. Leaves elliptic-oblong to oval, 4.5-8.5 cm. long, 2.5-4.5 cm. wide, rounded, acutish, or sometimes broadly and obtusely short-acuminate at the apex, narrowed or rounded at the base, dark brown above in drying, paler beneath, the petioles 4-8 mm. long; stipules deltoid, 3-5 mm. long; inflorescence corymbose, usually few-flowered, the pedicels 4-20 mm. long; calyx-lobes narrowly triangular, acute or acuminate; corolla white, becoming rose, its tube slender, 2.3-3 cm. long, its lobes linear, about as long as the tube; anthers exserted; capsule subcylindric, 1.5-3 cm. long.

Mountains above Villalba, Porto Rico (*H. T. Cowles 912*, collected June 1, 1925):—Cuba.

Vol. VI, p. 232, add **Gardenia Thunbergia** L.f., STARRY GARDENIA, of South Africa, occasionally planted for ornament in Porto Rico, is a shrub or small tree, about 4 m. high, with elliptic acuminate leaves, large white salverform flowers, the hard ellipsoid fruit about 5 cm. long.

Vol. VI, p. 237, **Stenostomum lucidum**, distribution, hillsides, dry southern and southwestern districts.

Vol. VI, page 249, add **Psychotria luconiensis** (C. & S.) F. Vill., of the Philippine Islands, planted at the Agricultural Experiment Station, Mayaguez, is a glabrous erect brittle shrub or small tree up to 5 m. high, the smooth oblong or elliptic-oblong leaves 5-20 cm. long, the terminal inflorescence at flowering time usually dense, the white flowers about 4.5 mm. long, the fleshy yellow or reddish fruits obovoid. (*Coffea luconiensis* C. & S.]

Vol. VI, p. 283, add, **Vernonia remotiflora** L. C. Rich., native of French Guiana, has been recorded as long ago apparently introduced on St. Thomas, but nothing is known of it there at the present time.

Vol. VI., p. 316, **Tridax procumbens**, distribution occasional in waste and cultivated grounds, Porto Rico, appearing like an introduced weed.

Phylum 2. PTERIDOPHYTA.

FERNS AND FERN-ALLIES.¹

By WILLIAM R. MAXON.

Plants mostly terrestrial or epiphytic, having a life cycle of two distinct phases, Sporophyte and Gametophyte. The Sporophyte is usually differentiated into root, stem, and leaf, is provided with vascular tissues, and bears spores asexually, these either alike (plants homosporous) or of two very unlike kinds called microspores and megaspores (plants heterosporous). The germinating spore produces the Gametophyte, or minute, inconspicuous sexual stage (prothallium). In the homosporous series the prothallia are similar, but may be either monoecious or dioecious; in the heterosporous series they are dissimilar and dioecious, the ones developing from microspores bearing only male reproductive organs (antheridia), and those from megaspores only female organs (archegonia). Fertilization consists in the impregnation of an egg cell (archegone) by the coiled motile male element (spermatozoid). The resulting growth is the Sporophyte, or conspicuous asexual stage, known as a fern or fern-ally.

Sporangia borne variously on the back of ample leaves, or in terminal spikes or panicles, or in special conceptacles.

Plants homosporous.

Sporangia very large, coalescent or separate, lacking an elastic ring, dehiscent by regular pores or slits, the walls many cells thick.

Fronds erect or inflexed in veneration; sporangia paniculate or spicate, the sterile segment usually appearing lateral.

Fronds circinnate in veneration; sporangia (in our species) coalescent in 2-rowed dorsal synangia.

Sporangia small, borne in either clusters or masses on ordinary blades or their modified parts, mostly rupturing irregularly by means of an elastic ring, the walls 1 cell thick.

Plants heterosporous, the sporangia borne in ovoid conceptacles.

Sporangia borne in the axils of relatively small scalelike leaves, these 4- to many-ranked, modified or not.

I. OPHIOGLOSSALES.

II. MARATTIALES.

III. FILICALES.

IV. SALVINIALES.

V. LYCOPODIALES.

Order 1. OPHIOGLOSSALES.

Sporophytes terrestrial or epiphytic, herbaceous, consisting of a short fleshy rhizome, bearing numerous fibrous, usually fleshy roots, and one or

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several leaves. Leaves (fronds) erect or pendent, not jointed, consisting of a basal common stalk bearing at its apex a simple to variously compound, sessile or stalked sterile blade and (in the fertile leaves) an erect long-stalked spore-bearing spike or panicle (sporophyll), or (in *Cheiroglossa*) the sporophylls several, short-stalked, and pendent. Sporangia in 2 rows, naked, opening by a transverse slit; spores uniform (plants homosporous), yellowish. Gametophytes (prothallia) hypogean, tuber-like, usually lacking chlorophyll and associated with an endophytic mycorrhiza.

A single family.

Fam. 1. OPHIOGLOSSACEAE.

Family 1. OPHIOGLOSSACEAE.

Characters of the order. Five genera, the following, and two others of the Old World tropics.

Sterile blade simple, entire or palmately lobed; venation reticulate; sporangia united in 2 rows in a simple slender fleshy spike.

Plants terrestrial; sterile blade small, entire; sporophylls erect, solitary.

Plants epiphytic; sterile blade large, palmately lobed; sporophylls pendent, usually several.

Sterile blade 1-4 times pinnately divided; venation free; sporangia globose, all distinct, borne in a spike or panicle.

1. *Ophioglossum*.

2. *Cheiroglossa*.

3. *Botrychium*.

1. OPHIOGLOSSUM (Tourn.) L. Sp. Pl. 1062. 1753.

Small herbaceous terrestrial plants. Rhizome short, hypogean, usually erect, terminating in the erect exposed bud of the following season. Leaves erect in vernation, 1-4, erect, fleshy, glabrous, arising at the side of the apical bud; common stalk slender; sterile blade simple, sessile or short-stalked, linear to ovate or reniform; venation reticulate, the areoles simple or with free and anastomosing veinlets. Sporophyll a simple slender erect long-stalked spike; sporangia large, subglobose, marginal, coalescent in 2 ranks, transversely dehiscent. (Greek, meaning snake-tongue, alluding to the form of the narrow sporophylls.) About 45 species, natives of both hemispheres. Type species: *Ophioglossum vulgatum* L.

1. *Ophioglossum reticulatum* L. Sp. Pl. 1063. 1753.

Plants 15-35 cm. high. Rhizome cylindric, 1-2 cm. long, 3-5 mm. thick, with persistent thick roots. Leaves usually solitary, rarely 2; common stalk mostly epigean, 5-15 cm. long; sterile blades nearly horizontal, deltoid-ovate to reniform, 3-10 cm. long, 2-7 cm. broad, usually short-stalked, often folded at the cordate, broadly auriculate, or somewhat truncate base, acute to obtuse or rounded at apex; areoles mostly compound, with few to numerous free or anastomosing, included veinlets; sporophyll 10-25 cm. long, the spike slender, 2-7 cm. long, somewhat apiculate; sporangia 20-60 pairs.

On clay banks and grassy slopes, at higher elevations, Porto Rico; St. Thomas; St. Jan.—Jamaica; Cuba; Hispaniola; Guadeloupe; Martinique; Grenada; Trinidad (?). Also Mexico to Brazil and Bolivia. Widely distributed in the Old World tropics.

2. CHEIROGLOSSA Presl, Abh. Böhm. Ges. Wiss. V. 4: 316. 1845.

Plants epiphytic; rhizomes stout, soft-paleaceous, bearing numerous thick fleshy fibrous roots. Leaves usually several, spreading and pendent; common

stalk elongate, succulent; sterile blade large, broad, palmately lobed or divided; venation areolate, the larger areoles elongate, with included free and anastomosing veinlets. Sporophylls usually several, simple, short-stalked, borne singly or in pairs at the base of the blade and along the upper part of the common stalk; sporangia discoid, strongly coalescent. (Greek, alluding to the resemblance of the sterile segment to a hand, and of the thick sporophylls to tongues.) Type and sole species: *Ophioglossum palmatum* L.

1. **Cheiroglossa palmata** (L.) Presl, Abh. Böhm. Ges. Wiss. V. 4: 317. 1845.

Ophioglossum palmatum L. Sp. Pl. 1062. 1753.

Rhizome 1–2.5 cm. long, 1–2 cm. thick, densely clothed with pale hairlike scales. Leaves 20–70 cm. long; common stalk 5–25 cm. long, flattish in drying; sterile blade narrowly to broadly obdeltoid, 10–45 cm. long, 5–25 cm. broad, palmately lobed or deeply divided into 2–10 unequal elongate lobes, these 5–22 cm. long, usually simple and entire, rarely laciniate at the tip, the divisions narrowly linear; larger areoles irregularly hexagonal, with included minor areoles and a few free veinlets. Sporophylls 1–15, to the leaf, linear, 1.5–7 cm. long, thick; sporangia 10–60 pairs.

Epiphytic in dense virgin forests, at higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Montserrat. Florida; Mexico to Brazil. Réunion Island.

3. **BOTRYCHIUM** Swartz, Journ. Bot. Schrad. 1800²: 110. 1801.

Plants terrestrial, fleshy; rhizomes hypogean, erect, bearing fleshy, often corrugated, coarse roots. Leaves 1–3, erect; common stalk wholly or partly hypogean, erect, short to elongate; sterile blade erect or bent down in veneration, oblique to horizontal, sessile to long-stalked, 1–4 times pinnately or ternately divided or compound, the segments usually small, free-veined. Sporophylls solitary, long-stalked, usually a 1–5-pinnate panicle; sporangia large, globose, sessile or nearly so. Bud for the following season borne at the apex of the rhizome, enclosed within the base of the common stalk. (Greek, alluding to the grapelike arrangement of the sporangia). About 25 species, found chiefly in the temperate regions of both hemispheres. Type species: *Osmunda Lunaria* L.

1. **Botrychium Jenmani** Underw. Fern Bull. 8: 59. 1900.

Plants usually slender; rhizome bearing numerous thick corrugated brown roots; bud densely silky-pubescent, entirely enclosed. Leaves 10–30 cm. long, the common stalk short, 1–3 cm. long, hypogean; sterile blade laxly ascending, stalked (1–5 cm.), deltoid to broadly pentagonal, 2–9 cm. long, 3–10 cm. broad, ternate or subternate, the basal pinnae deltoid or subpentagonal, stalked, 2 or 3 times subpinnately divided; ultimate segments cuneiform to oblong or ovate-oblong, or the terminal ones larger, subrhombic; outer margins finely serrulate; texture thick. Sporophylls greatly elongate, the short dense panicle about one-fifth as long as the stalk; spores maturing from February to April.

Open grassy slopes and brushy banks, Maricao and Monte Alegre, Porto Rico:—Jamaica; Cuba; Hispaniola.

Order 2. **MARATTIALES.**

Sporophytes terrestrial, with fleshy or tough, creeping or massive, erect rhizomes and soft coarse fleshy roots. Leaves (fronds) coarse, often very large, distichous or cespitose, stipulate, jointed to the rhizome, circinnate in

vernation, the blades simple to several times pinnate or pinnately divided, or once palmately divided, dimorphous or not. Sporangia separate or coalescent and forming thick, circular or oblong to linear synangia, opening by vertical pores or longitudinal slits. Spores uniform (plants homosporous), diplanate or triplanate. Gametophytes (prothallia) green, flat.

A single family.

Fam. 1. MARATTIACEAE.

Family 1. MARATTIACEAE.

Characters of the order. Six genera: The following, *Marattia* (which may be expected in Porto Rico), and 4 others confined to the Old World tropics, with numerous species.

1. **DANAEA** J. E. Smith, Mém. Acad. Turin 5: 420. 1793.

Rhizomes stout, oblique or horizontal, provided with thick cordlike roots. Sterile fronds erect or laxly spreading, distichous, simple or 1-pinnate; leaf-axes nodose, swollen at the insertion of the opposite pinnae, the lower nodes often with reduced pinnae or the pinnae wanting, the elongate stipes thus strongly nodose; veins free, simple or forked, parallel. Fertile fronds similar to the sterile, the divisions narrower; sporangia nearly covering the pinnae beneath, coalescent in double rows, forming linear immersed plurilocular synangia, opening by vertical pores, exindusiate. (Name in honor of Pierre Martin Dana, a Piedmont botanist). About 35 species, confined to the American tropics. Type species: *Acrostichum nodosum* L.

Stipes without nodes; pinnae of sterile blades 20–40 cm. long; veins simple but paired.

Stipes with 1–4 nodes; pinnae of sterile blades 5–18 cm. long; veins mostly forked.

Sterile pinnae 2–4 cm. broad, entire throughout, distinctly cartilaginous-marginate.

Sterile pinnae 1–2 cm. broad, sharply serrate toward apex, the margins not at all or faintly cartilaginous.

Sterile pinnae membranous, long-acuminate or subcaudate; terminal pinna present.

Sterile pinnae herbaceous, abruptly acute or acuminate; terminal pinna wanting.

1. *D. nodosa*.

2. *D. elliptica*.

3. *D. Urbani*.

4. *D. Jenmani*.

1. **Danaea nodosa** (L.) J. E. Smith, Mém. Acad. Turin 5: 420. 1793.

Acrostichum nodosum L. Sp. Pl. 1070. 1753.

Danaea longifolia Desv. Ges. Naturf. Freund. Berlin Mag. 5: 307. 1811.

Rhizome stout, creeping. Sterile fronds up to 2 m. long; stipe without nodes, very stout, sulcate, greenish brown, a little shorter than the blade, covered with minute, subsistent, purplish brown scales; blades broadly oblong, often 1 m. long, up to 70 cm. broad, the rachis stout, dull greenish; pinnae 7–15 pairs and a terminal one, sublustrous, slightly oblique, linear to oblong-linear (elliptic in young fronds), 20–40 cm. long, 3–5 cm. broad, usually subfalcate, unequally rounded or sometimes broadly cuneate at base, abruptly long-acuminate, the subcaudate tip lightly serrate, the margins elsewhere entire, slightly cartilaginous; midveins sparsely scaly; veinlets close, prominulous, mostly paired in origin. Sporophylls similar to the sterile fronds, but the pinnae much shorter and narrower (1.5–2.5 cm. broad).

Moist shady ravines at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Martinique; St. Vincent; Grenada. Also Mexico to South America.

2. **Danaea elliptica** J. E. Smith in Rees, Cycl. 11: *Danaea* no. 2. 1808.

Danaea media Liebm. Dansk. Vid. Selsk. Skrift. V. 1: 306. 1849.

Danaea oligosora Fourn.; Christ, Hedwigia 44: 369. 1905.

Rhizome stout, oblique, with long rigid roots up to 3 mm. thick. Sterile fronds coarse, stout, rigidly ascending, 40–90 cm. long; stipe stout, 1–4-nodose, deeply sulcate, olivaceous, darker at the nodes; blades broadly oblong to orbicular-deltoid or subovate, 20–35 cm. long, 15–30 cm. broad; pinnae 2–6 pairs and an enlarged, nearly conform, terminal one, oblique, elliptical or commonly oblanceolate-oblong, 8–18 cm. long, 2–4 cm. broad, nearly straight, unequally rounded to cuneate at base, rather abruptly long-acuminate at apex; margins entire throughout, unevenly repand, broadly cartilaginous; veins mostly once forked near the base. Sporophylls similar in general to the sterile fronds but longer, the blades narrower; pinnae pointed-elliptic to narrowly lance-oblong, up to 13 cm. long and 3 cm. broad.

In mountain forests, at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Martinique; Grenada. Mexico to northern South America.

3. **Danaea Urbani** Maxon, Journ. Wash. Acad. Sci. 14: 195. 1924.

Rhizome slender. Sterile fronds lax, up to 60 cm. long; stipe slender, dark olivaceous, up to 30 cm. long, deeply sulcate, with 2 or 3 narrow elongate nodes; blades lance-oblong, acuminate, imparipinnate, up to 30 cm. long and 12 cm. broad, the rachis obscurely alate or strongly so below the nodes; pinnae membranous, 10–12 pairs, oblique, 5–8 cm. long, 11–14 mm. broad, linear or oblong-linear, inequilateral at the cuneate base, long-acuminate or subcaudate, stalked, subfalcate; margins subentire to repand-dentate, or toward the tip dentate-serrate, the teeth cuspidate. Fertile fronds up to 75 cm. long; stipe with 3 or 4 nodes; blades up to 30 cm. long and 7 cm. broad; pinnae about 15 pairs and a terminal one, oblique, linear, 4–6 cm. long, 6–8 mm. broad, subfalcate; synangia 50–60 pairs.

Wet mountain forest, Mt. Morales, near Utuado, Porto Rico:—Hispaniola.

4. **Danaea Jenmani** Underw. Bull. Torrey Club 29: 677. 1902.

Rhizome slender, closely nodose. Sterile fronds 2–4, laxly ascending, 25–50 cm. long; stipe shorter than the blade, stout, 1–2-nodose, sulcate, conspicuously scurfy with small brown concolorous appressed scales; blades oblong or linear-oblong, 15–30 cm. long, 9–18 cm. broad, the rachis persistently scurfy, discontinuously alate; pinnae 10–15 pairs (a terminal one wanting), slightly oblique, straight or subfalcate, linear-oblong, 5–9 cm. long, 1–2 cm. broad, stalked, rounded or broadly cuneate at the inequilateral base, abruptly acute or acuminate at apex, here sharply serrate; midveins persistently scurfy. Fertile fronds 25–50 cm. long, the stipe stout, 1–2-nodose; blades 12–30 cm. long, 4–7 cm. broad; pinnae 12–15 pairs, linear, stalked, oblique, 2–6 cm. long, 5–8 mm. broad.

Virgin forest, Mt. Andubo, near Adjuntas, Porto Rico (*Sintenis* 4681):—Jamaica.

Danaea alata J. E. Smith, a Lesser Antilles species, was reported from Porto Rico by Urban in 1903 on the basis of *Sintenis* 4681 and 6458. No. 4681 is here referred tentatively to *D. Jenmani* Underw. No. 6458, of which only a large sterile specimen has been seen, is similar but may represent an undescribed species.

Danaea Wrightii Underw., a Cuban species, was reported from Porto Rico by Underwood in 1902 on the basis of *Sintenis* 4681, here referred to *D. Jenmani* Underw. *Sintenis* 6458 also was so listed by Urban in 1911.

Order 3. FILICALES.

Sporophytes terrestrial, epiphytic, or (in one family) aquatic, herbaceous to arborescent, consisting of a radicate and creeping, ascending, or erect primary axis, the stem (rhizome or caudex), and more or less expanded leaves (fronds), these minute to several meters long and of diverse form. Sporangia mainly borne on the under surface of the leaf, commonly in clusters (sori) on the veins or within special marginal indusia, or, less commonly, irregularly or in rows upon rachiform or scarcely foliose pinnae or segments, usually provided with an elastic ring of thick-walled cells (annulus) for spore dispersal. Indusia of various form, or wholly wanting.

Gametophytes normally in the form of green, flattish or filamentous prothallia, bearing both archegonia and antheridia together (monoecious) or, less commonly, on separate individuals (dioecious).

A. Sporangia sessile or short-stalked.

1. Sporangia not associated in definite sori, mostly (as to American species) borne upon rachiform or narrowly foliose pinnae or segments.

Annulus of sporangia often incomplete or wanting.

Sporangia (in American genera) borne in dense paniculate clusters, on fertile branches without chlorophyll; annulus lateral; plants of moist situations.

Fam. 1. OSMUNDACEAE.

Sporangia scattered in 1 or 2 rows within the revolute margins of narrow foliaceous segments; annulus vertical; plants usually aquatic.

Fam. 2. CERATOPTERIDACEAE.

Annulus of sporangia complete, subapical. Sporangia borne in rows; plants usually xerophilous.

Fam. 3. SCHIZAEACEAE.

2. Sporangia usually associated in definite sori.

- a. Sori mostly borne upon the back of the fronds (sometimes marginal by suppression of leaf tissue), the sporangia radial in one to several ranks upon definite receptacles arising from the veins or continuous with them; leaf-tissue several to many cells thick.

Sporangia subglobose or obconic, relatively few, dehiscing vertically; sori flattish; receptacles low.

Fam. 4. GLEICHENIACEAE.

Sporangia ovoid, very numerous, dehiscing horizontally; sori nearly globose; receptacles elevated, usually strongly so.

Fam. 5. CYATHEACEAE.

- b. Sori always marginal, terminal upon the modified elongate free ends of the veins (receptacles) within tubular, salverform, or bivalvular indusia; leaf-tissue usually 1 cell thick.

Fam. 7. HYMENOPHYLLACEAE.

B. Sporangia long-stalked.

Fam. 6. POLYPODIACEAE.

Family 1. OSMUNDACEAE.

Rhizome erect or creeping, woody, the roots hard and fibrous. Fronds erect, fasciculate, not jointed to the rhizome, the blades pinnately divided to 2-pinnate, usually of coarse aspect, conform or wholly dimorphic, or some of the pinnae dimorphic. Sporangia borne on the underside of ordinary foliaceous fronds or (in American species) in dense paniculate clusters, entirely replacing the vegetative tissue of certain pinnae or whole fronds, globose, short-stalked, dehiscing lengthwise; annulus few-celled or wanting; spores green, ephemeral. Prothallia green, flat, expanded, thickened ventrally. Three genera, the following and two others, both of the Old World; species about 20.

1. **OSMUNDA** L. Sp. Pl. 1063. 1753.

Coarse swamp or lowland plants, the rhizomes mostly hypogean, surrounded by a thick dense mass of wiry, black or dark brown roots. Leaves in large crowns, long-stalked, deciduously and loosely tomentose, wholly or partially dimorphic, arranged in two circles, the inner fertile and erect, developing first, the outer sterile and spreading, 1–2-pinnate, with regularly forked, prominent, free veins; stipes broadly expanded above the base to form sheathing wings. Sporangia densely clustered on the ultimate veinlets, replacing the leaf-tissue of some or all the pinnae; spores copious. (From Osmunder, a Saxon name for the god Thor.) About 10 species, of both hemispheres. Type species: *Osmunda regalis* L.

1. **Osmunda cinnamomea** L. Sp. Pl. 1066. 1753.

Osmunda bipinnata L. Sp. Pl. 1065. 1753.

Osmunda alata Goldie, Edinb. Phil. Journ. 6: 322. 1822.

Rhizomes and root-masses partly epigean, forming large tussocks. Fronds several, wholly dimorphic, 0.6–1.5 m. long, long-stipitate, the sheathing bases strongly produced anteriorly. Sterile blades oblong to lance-elliptic, acuminate, 0.4–1 m. long, 15–30 cm. broad, pinnate, the rachis nearly glabrous at maturity, a tuft of tomentum persisting at the base of each pinna; pinnae deeply pinnatifid, narrowly oblong, acuminate, 7–18 cm. long, 1.5–4 cm. broad, spreading or oblique, glabrous or glandular; segments close, oblong, subfalcate, acutish to rounded-obtuse, usually entire; veins once-forked. Fertile blades succulent, erect, soon withering, 2-pinnate, linear; segments non-foliose, densely covered by the cinnamomeous sporangia.

Coastal marshes and mangrove swamps, Porto Rico;—Bermuda; Jamaica; Cuba. Eastern North America, and from Mexico to Paraguay; also eastern Asia.

Family 2. **CERATOPTERIDACEAE**.

Plants aquatic or semi-aquatic, the short stem horizontal, sparsely scaly, rootless. Fronds alternate, successive, soft-herbaceous, viviparous, dimorphic, the sterile ones floating or emergent, 1 to several times pinnate or pinnatifid, the fertile ones longer, erect, several times pinnately divided, with linear ultimate segments; venation areolate, without included veinlets. Sporangia borne in 1 or 2 sparse rows on the veins of narrowly elongate areoles within the closely revolute margin, globose, thin-walled, subsessile, the annulus few- to many-celled; spores ephemeral, triplanate, the outer face reticulate. A single genus.

1. **CERATOPTERIS** Brongn. Bull. Soc. Philom. 1821: 186. 1821.

Characters of the family. (Greek, alluding to the antler-like appearance of the fertile fronds). Species about 4, of tropical regions. Type species: *Acrostichum thalictroides* L.

1. **Ceratopteris deltoidea** Benedict, Bull. Torrey Club 36: 472. 1909.

Plants always partly submerged; fronds several, up to 65 cm. long, the stipe flattish, not bulbous. Sterile fronds 15–50 cm. long, floating and emergent, or mature ones erect, the stipe half as long as the blade; blades deltoid, acute, 20–35 cm. long, 15–25 cm. broad, 2-pinnate-pinnatifid; pinnae several pairs, the basal ones deltoid, 9–12 cm. long, 9–14 cm. broad; ultimate segments lanceolate to unequally deltoid, 3–4 cm. long, 0.5–3 cm. broad, acute, thin-membranous. Sporophylls 40–65 cm. long; blades deltoid, 30–40 cm. long, 25–35 cm. broad,

4 times pinnately divided; segments linear-attenuate, 0.5–2.5 cm. long, 0.5–2 mm. broad; sporangia with well developed annulus and stomium; spores 16.

In ditches; Mayaguez, Coamo, Carmen, Porto Rico:—Jamaica. Also Florida and Louisiana; French Guiana; British Guiana.

Family 3. SCHIZAEACEAE.

Plants mainly terrestrial and xerophilous, the fronds erect or twining, of widely diverse form. Sporangia superficial, borne singly or in rows on narrow, more or less specialized lobes or terminal segments, or upon slender ultimate divisions of non-foliose pinnae, indusiate or non-indusiate, mostly obovoid or pyriform, provided with a definite subapical annulus contracted distally, the sporangium dehiscing by a longitudinal fissure. Prothallia flattish and simple, or somewhat filamentous and branched, terrestrial. Six genera and about 150 species, almost exclusively tropical.

Blades simple or repeatedly dichotomous; fibrovascular bundle of the rhizome central, solid; spores diplanate.

Fronds narrowly linear, simple; fertile segments spuriously digitate; sporangia apparently borne in 4 rows.

1. *Actinostachys*.

Fronds repeatedly dichotomous, the divisions close and numerous; fertile segments forming a pinnate spike; sporangia obviously in 2 rows.

2. *Lophidium*.

Blades pinnately lobed to decompound; fibrovascular bundle of the rhizome a reticulate tube; spores triplanate.

3. *Anemia*.

1. *ACTINOSTACHYS* Wall.; Hook. Gen. Fil. *pl.* 111, A. 1842.

Fronds simple, the blades erect or rigidly ascending, narrowly linear, simple and entire (the fertile tips excepted), grasslike, mostly triquetrous or flattish from a dark, terete or semi-terete base, prominently unicostate. Sporangiphores terminal, spuriously digitate in a penicillate tuft from a very short, inconspicuous prolongation of the costa. Sporangia in 2 rows, one upon each side of the costule, but apparently in 4 by the bending of the sporangia to left or right. Indusia continuous, formed by the narrowly reflexed margins of the simple segments. (Greek, in allusion to the raylike arrangement of the sporangiphores.) Species 4, tropical and subtropical. Type species: *Acrostichum digitatum* L.

1. *Actinostachys pennula* (Sw.) Hook. Gen. Fil. *pl.* 111, A. 1842.

Schizaea pennula Sw. Syn. Fil. 150, 379. 1806.

Schizaea trilobalis Schkuhr, Krypt. Gewächse. 1: 137. 1809.

Actinostachys trilobalis J. Smith, Lond. Journ. Bot. 1: 202. 1842.

Fronds numerous, closely fasciculate from a small ascending rhizome, 20–50 cm. long, strongly triquetrous toward the dark castaneous base and usually buried 2–10 cm. in the substratum, above green and gradually flattish, about 2 mm. broad, strongly and often sharply costate beneath, thus unequally triquetrous nearly throughout, lustrous, glabrous. Sporangiphores 6–14, linear, 2–5 cm. long, about 1 mm. broad, at first close and erect, at length divergent, unequal, mostly simple; sporangia numerous, spuriously 4-seriate: spores delicately maculate.

Shaded sandy thicket, Laguna Tortuguero, Porto Rico:—Guadeloupe; Trinidad. Costa Rica to Uruguay.

2. *LOPHIDIUM* Rich. Act. Soc. Hist. Nat. Paris 1: 114. 1792.

Fronds cespitose, erect, stipitate, once to repeatedly dichotomous, the divisions usually numerous, linear and flattish, or broader and conspicuously leafy,

unicostate or pluricostate, forming a definite flabelliform blade. Sporangiphores terminal upon excurrent costae of the leafy divisions or rarely upon non-foliose blades of similar form; fertile segments simple or dichotomous, borne in a pinnate spike not longer than the rachis of the sporangiophore. Sporangia borne in 2 rows close to the costa, crowded, partly within the recurved indusiform margin. (Greek, alluding to the crestlike sporangiophores.) About 5 species, widely distributed in tropical regions. Type species: *Lophidium latifolium* Rich.

1. **Lophidium Poeppigianum** (Sturm) Underw. N. Amer. Fl. 16: 38. 1909.

Schizaea Poeppigiana Sturm in Mart. Fl. Bras. 1^o: 181. 1859.

Schizaea occidentalis Griseb. Cat. Pl. Cub. 273. 1866.

Rhizome short-creeping, dark-hairy. Sterile fronds erect, fasciculate, 15–30 cm. long, the elongate stipes pilose, dull stramineous, concave-marginate along the anterior face; blades orbicular (the divisions spreading), 10–12 cm. broad, conduplicate and broadly obdeltoid in drying, 5–8 times dichotomous; ultimate divisions linear, 1–2 mm. broad, acutish, unicostate, the margins thickened, scabrous above. Fertile fronds stouter, 30–50 cm. long, far surpassing the sterile ones, 3 or 4 times dichotomous, the divisions slender, non-foliose; sporangiophores 1.5–2 cm. long, incurved at maturity, conduplicate, the segments slender, 15–25 pairs, pilose along the margins and costa.

Terrestrial or epiphytic, in primeval forest near Buenos Aires, Porto Rico:—Cuba. Also Costa Rica to British Guiana and Peru.

3. **ANEMIA** Sw. Syn. Fil. 6, 155. 1806.

Fronds mostly erect or ascending, either cespitose in several ranks upon a horizontal or ascending rhizome, or distichous and dorsal, the rhizome creeping. Blades mostly free-veined, pinnatifid to pinnately decompose, some of them skeleton-like and wholly fertile (the fronds thus dimorphous), or with only the basal pair of pinnae fertile, these usually elongate and surpassing the sterile portion of the blades, sometimes short and spreading. Sporangia borne in a close single row on either side of the ultimate divisions, these slender and semiterete (sporangia non-indusiate) or narrowly foliose and functioning as indusia. (Greek, alluding to the naked sporangia.) About 85 species, inhabiting tropical and subtropical regions. Type species: *Osmunda phyllitidis* L.

Fronds wholly dimorphous, i.e. either fully fertile or sterile.

Fronds partially dimorphous, i.e. only the basal pair of pinnae fertile.

Fertile pinnae arising at or near the base of the 1-pinnate sterile blade, non-indusiate.

Pinnae of sterile blades minutely crenulate.

Pinnae of sterile blades deeply and obliquely cleft into several distant narrow toothed segments.

Fertile pinnae distant, indusiate; sterile blades 2–3-pinnate.

1. *A. portoricensis*.

2. *A. hirta*.

3. *A. hirsuta*.

4. *A. adiantifolia*.

1. **Anemia portoricensis** Maxon, N. Amer. Fl. 16: 48. 1909.

Rhizome creeping; fronds dimorphous, dorsal, distichous, close. Sterile fronds recurved or ascending, 8–21 cm. long; stipes flexuous; blades oblong to oblong-deltoid, obtuse, 7–12 cm. long, 3–6 cm. broad, bipinnate at base; pinnae spreading, close, unequally deltoid-oblong to rounded-deltoid, with 1 or 2 pairs of suborbicular subsessile segments, the terminal one obtuse, cuneate-lobate; middle pinnae similar, or only deeply lobed, or with a free distal basal segment, exciso-cuneate below; margins strongly cartilaginous, subentire or lightly sinuate-dentate, subrevolute; leaf-tissue rigidly coriaceous, lustrous, minutely glandular, sparsely long-hirsute beneath, the hairs antrorsely curved. Fertile fronds erect,

slender, 10–22 cm. long; blades linear-oblong, very much shorter than the stipe; pinnae distant, short-stalked, the lowermost 1.5 cm. long; pinnules subflabellate, glandular-pilose.

Limestone cliffs and partly shaded or open, rocky slopes, Porto Rico, at lower and middle elevations. Endemic.

2. *Anemia hirta* (L.) Sw. Syn. Fil. 155. 1806.

Osmunda hirta L. Sp. Pl. 1064. 1753.

Anemia Breuteliana Presl, Abh. Böhm. Ges. Wiss. V. 4: 350 (excl. syn. and plate cited). 1845.

Rhizome ascending, stoutish; fronds several, the stipes of the fertile ones scarcely or not exceeding the sterile fronds. Fertile fronds 20–35 cm. long, the stipe longer than the sterile blade, densely rusty-villous; sterile blade broadly ovate-deltoid, acuminate, 8–15 cm. long, 6–11 cm. broad, pinnate, the rachis subflexuous, rusty-villous; pinnae 6–13 pairs, the basal ones largest, deflexed, short-petiolate, widely excavate below, all the pinnae inequilateral, obliquely lanceolate to narrowly lance-oblong, acute, or the uppermost oblong-spatulate and confluent; margins serrulate-crenulate; leaf tissue membranous, sparsely hirsutulous, the veins prominent above; fertile pinnae 8–17 cm. long, slightly exceeding the sterile blade, the stalks longer than the close panicle. Sterile fronds similar to the fertile, the blade slightly larger.

Shady cliffs and moist stream-banks, at middle and higher elevations, Porto Rico:—Hispaniola; St. Kitts; Guadeloupe; Martinique. Also South America.

3. *Anemia hirsuta* (L.) Sw. Syn. Fil. 156. 1806.

Osmunda hirsuta L. Sp. Pl. 1064. 1753.

Rhizome short-creeping; fronds clustered, the stipes of the fertile ones usually surpassing the sterile fronds. Fertile fronds erect, 15–43 cm. long; stipe slender, 5–27 cm. long, stramineous, deciduously hirsute; sterile blade oblong-lanceolate to ovate-oblong, 3–15 cm. long, 2–6 cm. broad, pinnate; pinnae 6–14 pairs, spreading, mostly oblong to ovate-oblong, acutish, excised below, deeply and obliquely cleft into several subequal, distant, linear or narrowly cuneate, toothed segments; leaf-tissue herbaceous, pilose on both sides, striate, the veins elevated above; fertile pinnae 7–23 cm. long, the stalk usually far surpassing the sterile blade, the panicle dense. Sterile fronds 7–25 cm. long; stipe 2–14 cm. long; blade like that of the fertile frond, or narrower and slightly larger.

Coamo, at Mt. Santana, Porto Rico (*Sintenis* 3219):—Jamaica; Cuba; Hispaniola; Tobago; Trinidad. Also Mexico to South America.

4. *Anemia adiantifolia* (L.) Sw. Syn. Fil. 157. 1806.

Osmunda adiantifolia L. Sp. Pl. 1065. 1753.

Ornithopteris adiantifolia Bernh. Neues Journ. Bot. Schrad. 1²: 50. 1806.

Rhizome creeping; fronds dorsal, distichous, the stipes of the fertile ones usually not equaling the sterile fronds. Sterile fronds arching or ascending, 15–70 cm. long, the stipe a little longer than the blade, glabrescent; blades ovate-deltoid or subpentagonal, 7–35 cm. long, 4–28 cm. broad, 2–3-pinnate; pinnae numerous, close, slightly ascending, stalked, excised below, inequilateral, the basal ones deltoid-lanceolate; ultimate segments mostly oblong-obovate, obtuse; leaf-tissue coriaceous, lustrous, sparingly hispid-pilosulous on both sides; margins erose-denticulate, thickened. Fertile fronds 15–85 cm. long; sterile blade usually much shorter than the stipe; fertile (basal) pinnae erect, remote, usually not equaling the sterile blade, the panicle sometimes much longer than the stalk.

Limestone cliffs and dryish brushy slopes, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Bahamas; Hispaniola; St. Kitts; Antigua; Guadeloupe; Dominica; Montserrat; Martinique; Trinidad. Florida; Mexico and Guatemala; northern South America.

Family 4. **GLEICHENIACEAE.**

Plants xerophilous, the rhizome usually branched and long-creeping. Fronds not jointed to the rhizome, erect or straggling, rarely 1-pinnate, usually consisting of a firm primary leaf-axis of indeterminate growth bearing 1 or several pairs of opposite lateral branches, these (1) 1-2-pinnate and determinate or (2) one to several times dichotomous, the included (apparently terminal) buds either dormant or developing secondary or tertiary leaf-axes similar to the primary, the ultimate branches (pinnae) usually in pairs, nearly or quite pinnate; segments (in American species) mostly elongate and pectinately arranged; veins free, once or several times forked or (in *Gleichenia*) simple. Sori superficial, non-indusiate, dorsal or (in *Gleichenia*) terminal upon the veins. Sporangia sessile, broadly pyriform, usually 2-6, radial from a low receptacle, or in a few species numerous and borne in more than one rank; annulus obliquely transverse, the sporangium opening by a vertical fissure; spores triplanate or diplanate. Prothallia flattish, green. Three genera and about 115 species, chiefly tropical.

1. **DICRANOPTERIS** Bernh. Neues Journ. Bot. Schrad. 1²: 38. 1806.

Characters of the family, excluding those assigned to the Old World genus *Gleichenia*. (Greek, alluding to the forked branches.) About 110 species, chiefly tropical. Type species: *Polypodium dichotomum* Thunb.

Rhizomes clothed with spreading articulate hairs; veins 2-5-forked; sori multisporangiate.

A pair of spreading or deflexed accessory pinnae borne at all but the ultimate nodes.

Accessory pinnae wanting.

Rhizomes clothed with flat short-ciliate scales; veins once-forked; sori 2-5-sporangiate.

1. *D. flexuosa*.
2. *D. pectinata*.
3. *D. bifida*.

1. **Dicranopteris flexuosa** (Schrad.) Underw. Bull. Torrey Club 34: 254. 1907.

Mertensia flexuosa Schrad. Goett. Gel. Anz. 1824: 863. 1824.

Mertensia rigida Kunze, Linnaea 9: 16. 1834.

Gleichenia flexuosa Mett. Ann. Lugd. Bot. 1: 50. 1863.

Gleichenia rigida Bomm. & Christ, Bull. Soc. Bot. Belg. 35¹: 174. 1896.

Not J. Smith, 1841.

Rhizome clothed with spreading castaneous articulate hairs, at length muricate. Primary leaf-axis at first erect, stout, terete; primary lateral branches distant, repeatedly forking, never developing a secondary leaf-axis; internodes unequal, naked, the primary ones mostly 6-10 cm. long, the others shorter, the nodes stipulate distally, at the lower side invariably bearing a pair of lance-oblong, spreading or deflexed, pectinate accessory pinnae (up to 13 cm. long); distal pinnae linear to oblong-lanceolate, 15-23 cm. long, 2-6 cm. broad, glabrous, deeply pectinate throughout, the segments linear, retuse, narrowly connected at the dilatate base, the margins strongly revolute; veins 2-4-forked, close, elevated above, deeply impressed beneath; sori multisporangiate, borne upon the distal and sometimes, also, the proximal veinlet of each group.

At lower and middle elevations, Porto Rico;—Jamaica; Cuba; Hispaniola; Montserrat; Martinique; Trinidad. Southern Alabama; Mexico to Brazil and Bolivia.

2. **Dicranopteris pectinata** (Willd.) Underw. Bull. Torrey Club 34: 260. 1907.

Mertensia pectinata Willd. Sv. Vet. Akad. Handl. II. 25: 168. 1804.

Mertensia brasiliensis Desv. Ges. Naturf. Freund. Berlin Mag. 5: 329. 1811.

Mertensia emarginata Raddi, Pl. Bras 1: 72. 1825.

Gleichenia nitida Presl, Rel. Haenk. 1: 70. 1825.

Gleichenia brasiliiana Spreng. Syst. Veg. 4: 27. 1827.

Gleichenia Hookeri J. Smith, Lond. Journ. Bot. 2: 381. 1843.

Rhizome clothed with spreading castaneous articulate hairs, at length scabrous. Primary leaf-axis at first erect, terete, greatly elongate, at length declining; primary lateral branches several pairs, stipulate, repeatedly and unequally forked, a falsely sympodial, naked, flexuous secondary axis formed by the alternate production of the unequal secondary branches, the shorter ones bearing a pair of pinnae or again unequally forked and bearing 2 pairs; included terminal buds invariably abortive; pinnae oblong-lanceolate to linear, attenuate, 10–25 cm. long, 1.5–6 cm. broad, subfalcate, glaucous beneath, fully pectinate; segments oblong to linear-oblong, narrowly connected, glabrous beneath or sparsely paleaceous along the costae and 3–5-forked prominulous veins, the scales substellate, deciduous; sori (often wanting) multisporangiate, nearly medial, borne on the distal veinlets.

Half-open ridges and dryish slopes, Porto Rico, at lower and middle elevations:—Cuba; Jamaica; Hispaniola; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Tobago; Trinidad. Mexico to Brazil and Bolivia.

3. *Dicranopteris bifida* (Willd.) Maxon, N. Amer. Fl. 16: 60. 1909.

Mertensia bifida Willd. Sv. Vet. Akad. Handl. II. 25: 168. 1804.

Gleichenia bifida Spreng. Syst. Veg. 4: 27. 1827.

Mertensia fulva Desv. Mém. Soc. Linn. Paris 6: 201. 1827.

Dicranopteris cubensis Underw. Bull. Torrey Club 34: 253. 1907.

Dicranopteris fulva Underw. Bull. Torrey Club 34: 255. 1907.

Rhizome thinly paleaceous, the scales castaneous, lance-attenuate, rigidly short-ciliate. Primary leaf-axis ascending, elongate, laxly paleaceous, the scales pale rusty, ciliate, extending to the internodes and rachises, imperfectly deciduous; primary lateral branches 2 or several pairs, once or twice forked, a secondary axis rarely developed; primary internodes of larger branches 2.5–7 cm. long, naked, or imperfectly pectinate above; secondary internodes 3.5–11 cm. long, usually fully pectinate; pinnae linear to linear-lanceolate, attenuate, 30–55 cm. long, 3–7 cm. broad, subarcuate, pectinate, the rachises lustrous, deciduously chaffy; segments linear from a dilatate basè, acutish or obtuse, densely rusty-tomentose beneath, the tomentum sometimes whitish and matted with age, rarely disappearing; margins entire, revolute; veins 18–35 pairs, 1-forked, prominulous beneath; sori mostly 3- or 4-sporangiate, inframedial, borne on the distal branch, imbedded in tomentum.

Roadside banks and clayey hillsides, sometimes in thin shade, Porto Rico, at lower to higher elevation:—Jamaica; Cuba; Hispaniola; Saba; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad. Also Mexico to Brazil and Bolivia.

Dicranopteris remota (Kaulf.) Maxon, a South American species, has been listed by Urban, as *Gleichenia remota*, upon a small specimen from Mayaguez (Krug 1949) so identified by Brause. The specimen (at Berlin) is too incomplete and immature for positive reference, but is not that species.

Dicranopteris sp. A single incomplete specimen from the upper slopes of Cerro dela Punta (Gleason & Cook P. 33) represents a species new to Porto Rico. Its alliance is with *D. rubiginosa* (Mett.) Maxon, a little-known plant of Colombia and Venezuela.

Family 5. CYATHEACEAE.

Plants mainly arborescent, the rhizome (caudex) usually simple, decumbent, ascending, or erect and 1–15 meters high. Fronds several or

numerous, borne in a crown, articulate or not, freely or imperfectly deciduous; blades 1-4-pinnate, mostly very large, lance-oblong to deltoid-ovate in outline. Sori indusiate or non-indusiate, essentially globose, borne upon the veins on the lower surface of the blade or (by suppression of the leaf-tissue) at the margin, the receptacle thus either dorsal or terminating the vein, elevated, varying in form, size, and vestiture. Sporangia numerous, crowded, radial in several ranks, the annulus oblique, with or without a stomium of thin-walled cells. Spores triplanate. About 9 genera and 750 species, chiefly of mountainous tropical regions.

Sori obviously indusiate.

Indusia either (1) cup-shaped, with even margins, not wholly enclosing the sporangia, or (2) globose, at first wholly enclosing them, rupturing irregularly, the divisions persistent to fugacious.

1. *Cyathea*.

Indusia proximal in attachment, somewhat semicircular, usually scale-like, often lobed or cleft, never enclosing the sporangia.

2. *Hemitelia*.

Sori non-indusiate or, in a few species, an extremely minute vestigial scale discernible at the proximal base of the receptacle, beneath the sporangia.

3. *Alsophila*.

1. *CYATHEA* J. E. Smith, Mém. Acad. Turin 5: 416. 1793.

Caudex erect and arborescent in most species, paleaceous, the base commonly with a thick supporting layer of interlaced adventitious roots. Fronds several or many, erect-arching or rarely drooping, the stipe usually spiny or muricate, paleaceous at base; blades usually of an ovate type, 2-4-pinnate; pinnae spreading, the minor rachises variously pubescent and paleaceous, commonly glabrescent with age and darker beneath; ultimate segments with a central costule and several pairs of simple to pinnately branched free veins. Sori dorsal, globose; indusia either (1) cyathiform, persistent, with firm even margins, not wholly enclosing the sporangia, or (2) globose, at first wholly containing the sporangia, bursting irregularly, the divisions persistent to fugacious. (Greek, alluding to the cuplike form of indusium of the typical species.) About 200 species, mostly of limited distribution in tropical regions of both hemispheres. Type species: *Polypodium arboreum* L.

Blades 2-pinnate, lanceolate or oblanceolate.

Stem horizontal, mostly hypogean; fronds long-stipitate, the blade only slightly narrowed at base.

1. *C. Brooksii*.

Stem erect; fronds nearly or quite exstipitate, the blade conspicuously reduced at base.

Plants small, the stem less than 1 m. high; blades 1 m. long, 30 cm. broad; segments 22-27 pairs; veins 7-9 pairs.

2. *C. dryopteroides*.

Plants large, the stem 6-12 m. high; blades 2-2.5 m. long, 40-70 cm. broad; segments 40-60 pairs; veins 15-18 pairs.

3. *C. pubescens*.

Blades 3-pinnate, of an ovate type.

Indusia globose, rupturing irregularly, the divisions subpersistent.

4. *C. Brittoniana*.

Indusia cyathiform, the margins even.

Rachises dull yellowish; costules bearing 1 or 2 white bullate scales at base beneath; indusia very shallow, glabrous.

5. *C. arborea*.

Rachises purplish-brown; costules minutely spinescent-paleaceous; indusia deeply cyathiform, hairy.

6. *C. portoricensis*.

1. *Cyathea Brooksii* Maxon, Contr. U. S. Nat. Herb. 13: 24. 1909.

Stem horizontal, mostly subterranean, about 40 cm. long, 3-4 cm. thick, closely paleaceous at apex, the scales dark brown, lanceolate, 5-8 mm. long. Fronds few, long-stipitate, up to 1.6 m. long; stipe 35-70 cm. long, brown, 1 cm. thick at the aculeolate base, thinly furfuraceo-pubescent, at first sparingly fibrillose-paleaceous; blade lanceolate, about 1 m. long, 30-45 cm. broad at middle, acute at apex, slightly reduced at base, fully 2-pinnate; pinnae numerous, alternate, slightly apart, sessile, linear-attenuate, the larger ones 17-28 cm. long, 2-4 cm. broad, the secondary rachis with a few linear, dark brown, deciduous

scales toward the base beneath, densely villous-hirsute beyond, with minute brown stellate scales intermingled; pinnules 40–45 pairs, linear, 1–2 cm. long, subfalcate, obtuse, sessile or mostly short-stalked, the upper ones constricted above the rounded base and unequally hastulate, the lower ones fully hastulate and cut to the costa, the basal divisions free; margins subentire to regularly serrate-crenate, or the basal pinnules pectinately lobed; costae minutely stellate-paleaceous and distantly griseous-hirsutulous beneath; veins 10–17 pairs, close, mostly once-forked near the base; sori 4–14 pairs, small, contiguous, borne against the costa; indusia shallowly cyathiform, slightly hirsutulous; receptacle large, capitate, barely included.

In forests near Maricao, Porto Rico, at 700 to 900 meters elevation:—Cuba; Hispaniola.

2. *Cyathea dryopteroides* Maxon, Amer. Fern Journ. 14: 99. 1925.

Trunk erect, about 60 cm. high. Fronds about 1 m. long, nearly or quite exstipitate; blades oblanceolate, attenuate at base, abruptly acuminate at apex, 30 cm. broad above the middle, nearly 2-pinnate; rachis dull castaneous, glabrescent beneath, laxly filiform-paleaceous above; pinnae numerous, spreading, sessile, subdistant, the largest ones 16 cm. long, 3.7 cm. broad at base, narrowly elongate-triangular, long-acuminate, fully pinnate at base, very deeply pinnatifid throughout; costae deciduously imbricate-paleaceous beneath, the scales mostly lance-attenuate, about 2 mm. long, dark lustrous brown with pale borders; segments 22–27 pairs, linear-oblong, 1–1.8 cm. long, 3.5–5 mm. broad, subfalcate, acutish, lightly joined at the dilatate base, coarsely crenate-serrate, the costule bearing a few stiff hairs above, sparsely paleaceous beneath, the scales minute, lanceolate, subbullate, yellowish brown, deciduous; veins 7–9 pairs, mostly once-forked, the branches distant; sori 3–6 pairs, inframedial; indusia cyathiform, dark brown, glabrous, large. Leaf-tissue herbaceous, dull green above, pale beneath, glabrous.

Mountain forest, Monte Cerrote, Porto Rico, at 900 to 1,050 meters elevation (Britton & Brown 5424.) Endemic.

3. *Cyathea pubescens* Mett.; Kuhn, Linnaea 36: 164. 1869.

Caudex stout, 6–12 m. high, 10–20 cm. thick, prickly, with tessellate scars. Fronds rigidly ascending, nearly exstipitate, lanceolate, 2–2.5 m. long, 40–70 cm. broad, short-acute at apex, abruptly reduced at base, 2-pinnate, the primary rachis stout, dark chestnut-brown, at base chaffy with long narrow glossy yellowish-brown scales and freely armed with stout curved spines; upper rachis rusty-puberulous beneath, densely yellowish-hirsute and furfuraceous above, with long filamentous scales intermixed; pinnae very numerous, contiguous, horizontal, ligulate, 20–35 cm. long, 2.5–3.5 cm. broad, sessile, rigid, the rachis rusty-hirsute and more or less furfuraceous beneath; segments 40–60 pairs, coriaceous, narrowly oblong to linear, falcate, acute or acutish, adnate (or the basal ones free), the margins bicrenate-serrate to deeply crenate, revolute; costae beneath obscurely bullate-paleaceous near the base, copiously yellowish-hirsute; veins 15–18 pairs, forked at base, freely yellowish-hirsute beneath; sori 8–10 pairs, exactly basal; indusia shallow, rigid; receptacle slender, exserted.

Wet forests at higher elevations, Porto Rico, often among palms:—Jamaica; Cuba; Hispaniola.

4. *Cyathea Brittoniana* Maxon, Journ. Wash. Acad. Sci. 14: 139. 1924.

Caudex 2.5–8 m. high. Fronds erect-spreading, up to 3 m. long; stipe yellowish green, armed (the spines slender, straight, pungent, up to 1.5 mm. long), conspicuously paleaceous, the scales lustrous, golden-brown, subulate-attenuate, up to 3.5 cm. long; blades ovate, 2 m. long, 1–1.2 m. broad, nearly 3-pinnate, the rachis muricate, glabrescent, lustrous; pinnae subdistant, laxly spreading, stalked,

linear-oblong, acuminate, 45–62 cm. long, 12–18 cm. broad, the rachis muricate beneath, sparsely hirsutulous, and bearing a few minute linear tortuous fimbriate-ciliate scales; pinnules 25–30 pairs, mostly alternate, apart, and short-stalked, linear-oblong, 6–10 cm. long, 12–18 mm. broad, obliquely pinnatifid to 1 mm. from the costa, the costa thinly hirsute beneath and distantly paleaceous, the scales ovate-attenuate, 1–2.5 mm. long, yellowish-brown, lustrous, denticulate-ciliate; segments membranous, oblong, falcate, acutish, 3.5–4 mm. broad, close, crenate-serrate, a few small bullate scales borne toward the base of the thinly hirsute costule; veins 8–10 pairs, oblique, mostly once forked, thinly hirsute beneath, as also the leaf-surface; sori 3–5 pairs, small, slightly inframedial; indusium membranous, subsistent; receptacle short-capitate.

Wet forest slopes, Mt. Alegrillo and Maricao, Porto Rico:—Cuba; Hispaniola; Trinidad.

5. *Cyathea arborea* (L.) J. E. Smith, Mém. Acad. Turin 5: 417. 1793.

Polypodium arboreum L. Sp. Pl. 1092. 1753.

Disphenia arborea Presl, Tent. Pter. 56. 1836.

Hemitelia arborea Fée, Gen. Fil. 350. 1852.

Caudex erect, 4–12 m. high, the fronds of mature individuals numerous, borne in a close spreading crown, articulate, freely deciduous, the scars oval to subhexagonal, subtessellate in 8–10 ranks. Fronds 2.5–4 m. long, the yellowish-green stipes subtuberculate, with a thick basal covering of dirty white, lance-attenuate scales up to 4 cm. long; blades ovate, acuminate, 2–3 m. long, 3-pinnate, the rachises dull yellowish, slightly muricate, glabrescent; pinnae mostly alternate, spreading, oblong, acuminate, petiolate, 40–80 cm. long, 15–35 cm. broad; pinnules 20–25 pairs, all but the lower ones sessile, close, spreading, lance-oblong to elliptic-lanceolate, attenuate, the apex serrate; segments 20–32 pairs, linear-oblong, subfalcate, dilatate, sharply and often deeply serrate; costules uniformly bearing 1 or 2 deciduous white bullate scales at base beneath; veins 10–13 pairs, 1–3-forked; sori 6–11 pairs; indusia shallow, saucer-like, yellowish brown; receptacle capitate, exserted, sometimes cleft.

Along steep watercourses and in wet hilly woods, at low and middle elevations, commonly in half-open situations, Porto Rico; Tortola; St. Thomas:—Jamaica; Cuba; Hispaniola; Saba; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada. Also Mexico and Venezuela; cultivated in Costa Rica.

6. *Cyathea portoricensis* Spreng.; Kuhn, Linnaea 36: 163. 1869.

Caudex 3–4 m. high, 8 cm. thick, prickly. Fronds ample, the stipe dark purplish-brown, toward the base armed with slender curved purplish spines, finely subulate-paleaceous, subfurfuraceous above; blades of an ovate type, 3-pinnate, the primary rachis purplish brown, lustrous, glabrescent; pinnae subsessile, oblong, up to 65 cm. long and 22 cm. broad, short-acuminate, the secondary rachis like the primary; pinnules approximate, 20–25 pairs, subequal, up to 12 cm. long, 2–2.5 cm. broad, sessile, narrowly oblong, acuminate, the costa rusty-hirsutulous above, sparsely yellowish-hirsute and deciduously paleaceous beneath, the scales small, thick, brown, with spinescent margins; segments subcoriaceous, about 20 pairs, oblique, 10–13 mm. long, 3 mm. broad, narrowly oblong, obtuse, crenate, mostly dilatate but distinct, the costules hirsute beneath and minutely spinescent-paleaceous; veins about 8 pairs, mostly 1–2-forked, yellowish-hirsute; sori 3–6 pairs, slightly inframedial; indusium deeply cyathiform, yellowish-brown, bearing numerous simple yellowish hairs without; receptacle slender, elongate, not exserted.

Shaded rocky ravines and wet forest slopes, Porto Rico, at middle and higher elevations. Endemic.

2. *HEMITELIA* R. Br. Prodr. Fl. Nov. Holl. 158. 1810.

Rhizome an erect caudex, the fronds similar in habit and dissection to those of *Cyathea*; or (subgenus *Cnemidaria*) the rhizome sometimes short, oblique or

weakly ascending, subarborescent, the blades of an oblong type, once or twice pinnate, the pinnae or pinnules mostly large, leafy, coarsely lobed or pinnatifid, the veins all free or the basal ones of adjacent lobes regularly united by a transverse veinlet, a single series of costal areoles thus formed. Sori globose, dorsal, large, solitary on the veinlets; sporangia numerous, borne radially in several ranks; indusia proximal, more or less semicircular, saccate or not, subentire, lobed, or sometimes lacerate-fimbriate. (Greek, half-scale, alluding to the semicircular indusia.) About 85 species, of the Old and New World tropics. Type species: *Cyathea multiflora* J. E. Smith.

Blades pinnate, the pinnae deeply pinnatifid.

Blades 2-pinnate.

Pinnules mostly adnate or semiadnate; sori nearly medial, the indusia white.

Pinnules stalked or sessile; sori distinctly supramedial, the indusia brownish.

1. *H. horrida*.

2. *H. Wilsoni*.

3. *H. escuquensis*.

1. **Hemitelia horrida** (L.) R. Br.; Spreng. Syst. Veg. 4: 125. 1827.

Polypodium horridum L. Sp. Pl. 1092. 1753.

Cnemidaria horrida Presl, Tent. Pter. 57. 1836.

Hemistegia horrida Fée, Gen. Fil. 351. 1852.

Hemitelia Hookeri Presl, Abh. Böhm. Ges. Wiss. V. 5: 350. 1848.

Hemitelia Hookeriana Schlecht. Bot. Zeit. 14: 474. 1856.

Rhizome 15–25 cm. thick, short or rarely up to 1 m. long and ascending. Fronds several, erect, up to 3 m. long, the brownish stipe freely armed with short straight spines, these often extending to the stout lower rachis; blades oblong, abruptly short-acuminate, 1.5–2.5 m. long, up to 1.2 m. broad, pinnate-pinnatifid; pinnae numerous, spreading, close, subopposite, sessile, lance-deltoid, long-acuminate, up to 65 cm. long, 10–25 cm. broad, deeply pinnatifid, the pinnules close, connected at the subdilatate base, narrowly oblong and acuminate to linear-attenuate, the tips serrulate, or in young fronds the pinnules often obliquely rounded-obtuse; leaf tissue rigidly herbaceous, dark and lustrous above, pale beneath; costae and costules nearly devoid of scales; veins mostly in groups of 4 or 5, close, glabrescent, the basal ones mostly united by a transverse veinlet; sori supramedial, forming a close sinuous row near the margin; indusia thin, pale, subsistent.

Wet shady ravines, usually at the edge of forests, Porto Rico, at lower to higher elevations:—Jamaica; Cuba; Hispaniola. Also Costa Rica and northern South America.

2. **Hemitelia Wilsoni** Hook. in Hook. & Baker, Syn. Fil. 30. 1865.

Caudex 2.5–5 m. high. Fronds up to 2.5 m. long, short-stipitate; blades ample, apparently oblong-ovate, 1.2–2 m. long, 1–1.5 m. broad, 2-pinnate, the rachis brownish-stramineous, smooth; pinnae spreading, subsessile, up to 80 cm. long, 12–25 cm. broad, linear-oblong, acuminate; pinnules 20–30 pairs, distant, oblong-lanceolate to linear, alternate, the basal ones subsessile, the others mostly adnate or semiadnate, lobed midway to the costa throughout, or, if only in the apical half, the lower portion narrower and subentire; costae bearing a few flat appressed whitish scales beneath; larger lobes 3–8 mm. long, 3–5 mm. broad, oblique, broadly oblong, rounded-obtuse; veins 6–10 pairs, oblique, close, mostly simple, deciduously arachnoid-paleaceous, free or rarely the basal ones joined by a transverse veinlet; sori 3–7 pairs, medial; indusia ample, white, thin, persistent, proximal or subcycathiform.

Moist forest, Finca Alvarez and Maricao, Porto Rico; rare:—Jamaica; Hispaniola.

3. **Hemitelia escuquensis** Karst. Fl. Columb. 2: 181. pl. 196. 1869.

Caudex 2.5–4 m. high, rough toward the apex. Fronds erect-spreading, 2–2.5 m. long; stipe up to 80 cm. long, light dull brown, distantly muricate, the

scales few, narrowly triangular-attenuate, 1–1.5 cm. long, castaneous, subentire; blades ovate, acuminate, 1.2–1.7 m. long, 0.9–1.2 m. broad, the rachis brownish or olivaceous, glabrescent beneath; pinnae alternate, ovate-oblong, 45–60 cm. long, 20–30 cm. broad, petiolate, abruptly acuminate, the rachis nearly naked and glabrous beneath; pinnules about 15 pairs, sessile or the lower ones petiolate (2–8 mm.), oblong-lanceolate, 10–15 cm. long, 2.5–4.5 cm. broad, long-acuminate, pinnatifid, the costa bearing a few minute scales; segments thin-herbaceous, 13–15 pairs, narrowly oblong, subfalcate, crenate or toward the obtuse apex crenate-lobate, 5–7 mm. broad, connected by a costal wing 2 mm. broad, the costa, veins, and leaf-surface minutely glandular-puberulent beneath; veins 8–11 pairs, forked or the larger lobes with 2 or 3 pairs of oblique branches; sori 3–11 pairs, supramedial; indusia ample, concave, entire or bipartite.

Wet forested slopes, Porto Rico, at middle and higher elevations; rare. Western Venezuela (Maracaibo Harbor).

Hemitelia grandiflora (Willd.) Spreng., erroneously reported from Porto Rico, is a Lesser Antilles species, *H. Imrayana* Hook. and *H. insignis* Fée being exactly synonymous. The Porto Rican material so referred is *H. horrida* (L.) R. Br.

Hemitelia obtusa Kaulf., a species apparently confined to Grenada and St. Vincent, has been erroneously reported from Porto Rico on specimens representing young states of *H. horrida* (L.) R. Br.

3. **ALSOPHILA** R. Br. Prodr. Fl. Nov. Holl. 158. 1810.

Similar to *Cyathea*, but in general having the sori strongly paraphysate and devoid of indusia or, in a few species, with a minute vestigial scale concealed beneath the sporangia at the proximal side of the receptacle. (Greek, alluding to the shady habitat of most species.) About 250 species, mainly of mountainous tropical regions. Type species: *Alsophila australis* R. Br.

Blades of an oblong-ovate type, 1–2-pinnate; sori globose, the receptacle large, with numerous sporangia; rhizome scales linear to ovate.

Scales ovate, castaneous, concolorous; stipe muricate or slightly aculeolate at base; segments broadly oblong, close, broadly joined, lustrous, the veins elevated; indusial scale wanting.

Scales linear-attenuate, bicolorous; stipe strongly aculeate throughout; segments oblong, apart, narrowly joined, dull, the veins impressed above; indusial scale usually present.

Blades of a deltoid-ovate type, 3-pinnate; sori hemispheric, the receptacle low, with few sporangia; rhizome scales capillary, 1 cell broad.

1. *A. borinquena*.

2. *A. aquilina*.

3. *A. quadripinnata*.

1. **Alsophila borinquena** Maxon, Amer. Fern Journ. 15: 56. 1925.

Rhizome decumbent, 10–30 cm. long, or erect, up to 1 m. high; scales ovate-attenuate, 1–1.5 cm. long, light castaneous, concolorous, lustrous. Fronds 1–2 m. long, the stipes olivaceous, distantly muricate or low-aculeolate at base; blades oblong-ovate, 0.5–1.5 m. long, the smaller ones pinnate-pinnatifid, the larger 2-pinnate-pinnatifid; rachis dull olivaceous, unarmed, glabrate; pinnae stalked, articulate, those of small states 10–16 cm. long, 2–5 cm. broad, narrowly lance-oblong, long-acuminate, pinnatifid, the segments close, oblong, mostly falcate, serrate-crenate, with a single or double row of sori; pinnae of large fronds deltoid-oblong, acuminate, 30–45 cm. long, 15–20 cm. broad, stalked (3–5 cm.), with about 12 pairs of stalked articulate distant pinnules, these linear-oblong, long-acuminate, pinnatifid about two-thirds the distance to the elevated costa; segments oblong, close, slightly serrate-crenate at apex, the costule bearing 1 or 2 minute, deciduous, light castaneous, ovate-attenuate, bullate scales; veins 7–10

pairs, elevated, simple or some of the proximal ones acutely once-forked; sori 6–9 pairs, small, the lower ones supramedial, the others nearly medial; indusial scale wanting. Leaf-tissue spongiouse-herbaceous or coriaceous, lustrous, glabrous.

Moist rocky forests and along trails, Porto Rico, at middle and higher elevations. Endemic.

2. *Alsophila aquilina* Christ, Bot. Jahrb. Engler **24**: 83. 1897.

Alsophila gracilis Underw. & Maxon, Bull. Torrey Club **29**: 577. 1902.

Alsophila aquilina Maxoni Rosenst. Repert. Nov. Sp. Fedde **6**: 179. 1908.

Rhizome 2–8 m. high, 4–8 cm. thick, very spiny; scales tufted-imbricate, rigid, linear-attenuate, 1.5–2 cm. long, strongly bicolorous. Fronds 1–2 m. long, ascending, the stipes long-adnate, subpersistent, grayish-buff from a brownish base, freely aculeate, the spines straight, 3–5 mm. long; blades oblong, acuminate, 0.6–1.5 m. long, 30–75 cm. broad, 2-pinnate-pinnatifid, the rachis dark-stramineous, short-aculeate; pinnae oblong to deltoid-oblong, abruptly long-acuminate, 15–40 cm. long, 6–13 cm. broad, stalked, the rachis deciduously punctate-paleaceous beneath; pinnules 12–16 pairs, distant, stalked (1–5 mm.), linear-oblong to narrowly deltoid, attenuate-caudate, pinnatisect at base, elsewhere very deeply pinnatifid, the costae and costules bearing a few minute roundish bullate brownish scales; segments oblong to linear-oblong, obtuse, subdistant (the basal ones often free), lightly serrate-bicrenate throughout, the margins revolute; veins 6–8 pairs, mostly once-forked at a wide angle, impressed above; sori 3–6 pairs, medial, a minute glossy indusial scale usually persistent at the proximal base of the globose receptacle. Leaf-tissue coriaceous, dull green above, paler beneath.

Rocky forests and river banks, Porto Rico, at lower and middle elevations:—Cuba; Hispaniola. Also in Jamaica?

3. *Alsophila quadripinnata* (Gmel.) C. Chr. Ind. Fil. 47. 1905.

Polypodium glaucum Sw. Prodr. 134. 1788. Not Thunb. 1784.

Polypodium quadripinnatum Gmel. Syst. Nat. **2**^o: 1314. 1791.

Polypodium pruinatum Sw. Journ. Bot. Schrad. **1800**²: 29. 1801.

Alsophila pruinata Kaulf.; Kunze, Linnaea **9**: 99. 1834.

Lophosoria pruinata Presl, Abh. Böhm. Ges. Wiss. V. **5**: 345. 1848.

Lophosoria glauca Kuhn, Bot. Jahrb. Engler **24**: 83. 1897, as syn.

Stem short (rarely 1 m. high), 8–15 cm. thick, sometimes multicapital, densely lanate with grayish-fulvous capillary scales. Fronds few, 2–4 m. long, ascending, the stipes as long as the blades, unarmed, lanate at base; blades sub-deltoid, 1–2 m. long, 1–1.5 m. broad, 3-pinnate, the pale brown or dull stramineous rachises glabrescent beneath; pinnae distant, stalked, inequilateral, deltoid-oblong, acuminate, mostly 50–75 cm. long, the basal ones slightly reduced; pinnules laxly spreading, deltoid-oblong to linear-deltoid, attenuate, mostly stalked; segments numerous, apart, short-stalked to adnate, acute, very deeply pinnatifid (pinnatisect at base), the lobes deltoid to deltoid-oblong; veins pinnate; sori usually basal, the sporangia few, mixed with capillary paraphyses and similar scales of the under surface. Leaf-tissue pale green above, strongly glaucous beneath, herbaceous.

Damp rocky ravines and forest openings, Porto Rico, at higher elevations:—Jamaica; Cuba; Hispaniola. Also, Mexico to Chile.

Alsophila aspera (L.) R. Br. was reported from Porto Rico on Sintenis specimens, so identified by Kuhn, which pertain to *A. aquilina* Christ. *Alsophila aspera* was based upon Plumier's plate 3, illustrating a Haitian plant, and in a strict sense is known only from Jamaica, Cuba, and Hispaniola.

Alsophila gibbosa Klotzsch (Linnaea **18**: 542. 1844) was reported by Urban on the basis of a Sintenis specimen (no. 1001b), so identified by Kuhn, which is

A. borinquena Maxon. *Alsophila gibbosa*, founded on Schomburgk 1124 from British Guiana, is apparently confined to northern South America.

Alsophila nitida Kunze (Ettingsh. Farnkr. Jetztw. 222. pl. 154, f. 4, 8, pl. 155, f. 1, 7. 1865) was reported from Porto Rico on Sintenis material, so identified by Kuhn, which pertains to *A. borinquena* Maxon. *Alsophila nitida*, based upon Martinique specimens, is a synonym of *Hemitelia muricata* (Willd.) Fée, a Lesser Antilles species.

Family 6. POLYPODIACEAE.

Leafy plants of various habit, the rhizomes creeping to erect, often stout. Fronds pendent to spreading or erect, usually stalked, the blades uniform to strongly dimorphous, simple to several times pinnatifid or pinnate, or decompound, coiled in veneration. Sporangia long-stalked, provided with an incomplete vertical annulus and opening transversely, borne promiscuously on the under side of wholly fertile blades, or upon non-foliose or partially foliose blades, or more commonly in lines or clusters (sori) upon the veins of ordinary foliose blades beneath. Indusia of various form, or wanting, developing from either the veins or the margin of the blade. Prothallia green. About 150 genera and 6,000 species, widely distributed, including by far the greater number of living ferns.

A. Sporangia borne upon the leaf-tissue of special fertile blades or upon their greatly modified, reduced parts.

1. Sterile blades simple and entire.

Veins free or, in a few species, casually joined toward the margin.

Veins all united in regular areoles.

Fronds articulate, ascending, paleaceous; fertile blades reduced, densely sporangiate.

Fronds not articulate, pendent, naked; fertile blades not reduced, the sporangia borne intermittently in groups, mainly within the areoles.

2. Sterile blades pinnate or palmately dissected.

a. Plants mosslike, intricate; sterile blades reniform, palmately divided, usually flabellate-multifid.

b. Plants not mosslike; sterile blades elongate, simply pinnate in our species.

Rhizomes erect, massive; fertile parts copiously paraphysate

Rhizomes scandent or creeping, slender; paraphyses few or wanting.

Fertile blades greatly contracted, not leaf-like, the segments sporangiferous on all sides.

Fertile blades reduced but leaf-like, the segments sporangiferous only beneath.

Plants mainly terrestrial; venation copiously areolate.

Plants mainly epiphytic; veins free, at least beyond the transverse subcostal venule.

B. Sporangia associated in definite lines or clusters (sori).

1. Sori submarginal, borne at the end of the excurrent veins or upon an elongate intramarginal receptacle connecting them.

a. Veins copiously anastomosing, the areoles with included veinlets.

b. Veins free, or, if anastomosing, the areoles without included veinlets.

*Blades narrowly linear, simple, entire; sori non-indusiate.

Areoles uniseriate.

Areoles pluriseriate

**Blades palmately lobed to several times pinnate; sori mostly indusiate.

†Sporangia borne on the under side of the entire modified margin or of sharply reflexed marginal lobules.

1. *Elaphoglossum*.

2. *Hymenodium*.

5. *Anetium*.

3. *Rhipidopteris*.

4. *Acrostichum*.

34. *Polybotrya*.

35. *Leptochilus*.

33. *Stenochlaena*.

10. *Paltonium*.

6. *Vittaria*.

7. *Ananthacorus*.

13. *Adiantum*.

- ††Sporangia not so borne.
 †Leaf margins revolute to broadly reflexed, mostly somewhat modified or giving rise to an introrse indusium.
 §Sporangia terminating the veins, the sori separate in origin but often confluent laterally.
 Blades simple, palmately lobed; veins areolate in our species.
 Blades 1-4-pinnate; veins free.
 Rhizomes hairy; primary pinnae few, subopposite.
 Rhizomes paleaceous; primary pinnae numerous, mostly alternate (digitate in 1 species).
 Margins unmodified; vein-ends not enlarged, the sporangia often decurrent.
 Margins usually much modified; vein-ends enlarged; sporangia not decurrent.
 Sori numerous, close, mostly confluent, protected by the common indusium or indusiform margin.
 Sori few, distant; indusia separate, formed by sharply reflexed, modified marginal lobules.
 §§Sporangia borne in a continuous line upon a veinlike receptacle connecting the vein-ends.
 Rhizomes non-paleaceous.
 Plants succulent; rhizome carnose, green, short-creeping; sori lateral; indusia single.
 Plants not succulent; rhizome woody, slender, wide-creeping underground; sori occupying the whole margin; indusia double.
 Rhizomes paleaceous.
 Blades strongly dimorphous.
 Blades uniform.
 Rhizomes wide-creeping; fronds distant; spores diplanate.
 Rhizomes short-creeping to erect; fronds fasciculate; spores triplanate.
 ††Leaf margins not revolute or reflexed; indusia extrorse, often joined laterally to an opposed, more or less modified leaf-lobule.
 §Indusia attached only at sinus; pinnae articulate, deciduous.
 §§Indusia attached at base and sides, or at base only (if transversely linear); pinnae not articulate.
 Rhizomes densely hairy.
 Indusium flattish, attached at base and sides, the soral pouch pocket-like; segments narrowly cuneate.
 Indusium convex, adnate laterally to the concave opposed lobule, the soral pouch cyathiform.
 Rhizomes paleaceous.
 Fronds scandent, indeterminate; rachises usually spiny.
 Fronds erect, determinate; rachises unarmed.
 Sori solitary, terminating the veins; indusia adnate laterally, forming soral pouches.
 Sori usually continuous upon a transverse veinlike receptacle connecting the vein-ends; indusia transversely linear, attached only at base.
 2. Sori dorsal upon the veins, or, if terminal, not submarginal.
 a. Sori greatly elongate, often irregular, following the course of the veins throughout; indusia wanting.
 *Fronds nearly or quite exstipitate.
 Blades ecostate, cuneiform, fimbriate or cleft at apex; veins free; sori superficial.
14. *Doryopteris*.
 15. *Hypolepis*.
 16. *Notholaena*.
 17. *Cheilanthes*.
 18. *Adiantopsis*.
 19. *Anisosorus*.
 20. *Pteridium*.
 21. *Onychium*.
 22. *Histiopteris*.
 23. *Pteris*.
 43. *Nephrolepis*.
 44. *Sphenomeris*.
 48. *Dennstaedtia*.
 45. *Odontosoria*.
 47. *Saccoloma*.
 46. *Lindsaea*.
 8. *Hecistopteris*.

- Blades costate, narrowly elongate, entire; venation areolate; sori somewhat immersed.
- **Fronds strongly stipitate.**
- Blades subdimorphous.
- Fronds in 2 series, the sterile ones short and rotate; blades palmately lobed; veins areolate.
- Fronds all erect; blades pinnate; veins free.
- Blades uniform.
- Rhizomes paleaceous; blades ceraceous beneath in our species.
- Rhizomes clothed with septate hairs; blades not ceraceous.
- b. Sori roundish to linear, regular; indusia present or not.
- *Fronds jointed to the rhizome; indusia wanting.
- Sori linear, consisting of a double costal line of sporangia, early confluent.
- Sori roundish or oval, usually distinct.
- **Fronds not jointed to the rhizome; indusia mostly present.**
- †Sori elliptical to narrowly linear; indusia lateral.
- ‡Sori numerous, solitary on the lateral veins.
- Indusia at least partially double; scales with elongate cells, the walls equally thickened.
- Indusia single; scales clathrate, the cells with thickened lateral walls.
- Pinnæ cordate-clasping; veins areolate.
- Pinnæ not cordate-clasping; veins free.
- ‡‡Sori a pair to each pinna, borne upon a transverse veinlet connecting the lateral veins.
- Fronds strongly dimorphous, the fertile blades non-foliose; sori intramarginal.
- Fronds nearly uniform; sori borne against the costa of foliose pinnæ.
- ††Sori roundish, reniform, lunate, or hippocrepiform, rarely elliptical; indusia (if present) globose, centrally peltate, or attached at sinus.
- ‡Fronds (in our species) strongly jointed to long stipelike phyllopodia.
- ‡‡Fronds not jointed.
- §Blades strongly dimorphous; indusia hippocrepiform.
- §§Blades uniform or subdimorphous; indusia (if present) globose, or orbicular to lunate.
- αPinnæ articulate, deciduous.
- Sori dorsal (in our species); indusia entire, centrally peltate.
- Sori terminal; indusia attached at the deep or shallow sinus.
- ααPinnæ not articulate, persistent.
- βVeins free or partly connivent, or, if anastomosing, the areoles subequal and arranged in 1 or 2 regular rows.
- Blades usually rigid, paleaceous, the divisions mostly auriculate and sharply serrate or spinulose; indusia (if present) orbicular, entire, centrally peltate.
- Blades mostly herbaceous, never strongly paleaceous, the divisions rarely spinulose; indusia (if present) usually roundish-reniform, attached at sinus.
- ββVeins copiously anastomosing, the areoles irregular and unequal.
- Indusia superior, roundish-reniform, and attached at sinus, or rarely orbicular, entire, and centrally peltate.
- Indusia inferior in attachment, at first globose and enclosing the sporangia, soon pateriform.
9. *Polytaenium*.
24. *Hemionitis*.
25. *Trismeria*.
26. *Pityrogramma*.
27. *Psilogramme*.
11. *Cochlidium*.
12. *Polypodium*.
28. *Diplazium*.
29. *Hemidictyum*.
30. *Asplenium*.
31. *Struthiopteris*.
32. *Blechnum*.
42. *Oleandra*.
36. *Fadyenia*.
37. *Cyclopeltis*.
43. *Nephrolepis*.
38. *Polystichum*.
39. *Dryopteris*.
40. *Tectaria*.
41. *Hypoderris*.

1. ELAPHOGLOSSUM Schott, Gen. Fil. under *pl.* 14. 1834.

Mainly epiphytic forest ferns of medium size, the rhizomes suberect or usually creeping, paleaceous. Fronds cespitose or mostly distichous, erect to

pendent, mostly stipitate, articulate upon subsistent phyllopodia (these often elongate and terete), dimorphous in function. Blades simple and entire, mostly elongate, membranous to thick-coriaceous, strongly costate, the sterile ones sparsely to densely paleaceous or apparently naked; veins oblique to spreading, simple or mostly 1-3-forked, parallel, clavate or not, free, casually anastomosing, or rarely joined at the end by a submarginal veinlet. Fertile blades often contracted or different in form from the sterile, the whole under surface densely sporangiferous, paraphysate. (Greek, stag's-tongue, alluding to the elongate entire fronds.) Species about 400, chiefly tropical. Type species: *Acrostichum simplex* Sw.

A. Blades of sterile fronds conspicuously paleaceous, at least along the margins.

Scales borne freely upon the surfaces of the sterile blades.

Sterile fronds 4-12 cm. long, long-stipitate, the blades oblong or elliptic, rounded at apex, 5-15 mm. broad.

Sterile fronds 20-55 cm. long, nearly exstipitate, the blades linear-oblancoate, long-acuminate at apex, 2.5-5 cm. broad.

Scales of the sterile blades (microscopic ones excepted) confined to the costa and margins.

Marginal and costal scales dark brown, linear-setiform from a minute, cordate or deltoid base, deciduous.

Marginal and costal scales yellowish brown, ovate-oblong or roundish-cordate, widely imbricate, persistent.

B. Blades of sterile fronds naked or obscurely paleaceous, the scales (if present) punctiform, mostly microscopic.

1. Sterile fronds nearly or quite exstipitate.

Rhizome 1-2 cm. thick, conspicuously paleaceous, the scales fulvous, 2-4.5 cm. long; fronds pendent, narrowly linear, very thick, opaque.

Rhizome 3-5 mm. thick, obscurely paleaceous, the scales dark brown, 2-3 mm. long; fronds ascending, lance-linear, thin, translucent.

2. Sterile fronds distinctly stipitate.

Rhizome 2 mm. thick or less, the scales few, thick, rigid, fuscous; veins of sterile blades very oblique.

Rhizome 3-12 mm. thick, the scales numerous, thin, fulvous to castaneous; veins oblique-spreading.

Fronds subdistant; rhizome wide-creeping, 3-5 mm thick, the scales lax, at length deciduous.

Fronds closely distichous; rhizomes curved-ascending or creeping, copiously and persistently paleaceous.

Margins of sterile blades finely repand, whitish-scarioso; vein-tips transversely arcuate, often subcontinuously joined.

Margins of sterile blades cartilaginous and revolute; vein-ends free, enlarged or not.

Fronds laxly ascending or spreading; sterile blades linear; veins not reaching the margin.

Fronds erect; sterile blades not linear; veins excurrent to the margin.

Rhizome cylindric, enveloped in a mass of fulvous scales; sterile blades linear-lanceolate to pointed-elliptic, acute at base.

Rhizome subflexuous, laxly paleaceous, the scales ferruginous or darker, lance-linear; sterile blades narrowly oblancoate, long-attenuate downward.

1. *E. piloselloides*.

2. *E. apodum*.

3. *E. erinaceum*.

4. *E. decoratum*.

5. *E. Herminieri*.

6. *E. flaccidum*.

7. *E. glabellum*.

8. *E. Underwoodianum*.

9. *E. rigidum*.

10. *E. Dussii*.

11. *E. pteropus*.

12. *E. firmum*.

1. *Elaphoglossum piloselloides* (Presl) Moore, Ind. Fil. 13. 1857.

Acrostichum piloselloides Presl, Rel. Haenk. 1: 14. pl. 2, f. 1. 1825.

Acrostichum pilosella Spreng. Syst. Veg. 4: 34. 1827.

Acrostichum pusillum Mett.; Kuhn, Linnaea 36: 43. 1869.

Elaphoglossum pusillum C. Chr. Ind. Fil. 314. 1905.

Rhizome erect or curved-ascending, 5–15 mm. long, 2–4 mm. thick, densely paleaceous; scales erect, tufted, subulate-acicular, 3–5 mm. long, thin but firm, light ferruginous, denticulate. Sterile fronds numerous, cespitose, ascending or spreading, mostly 4–12 cm. long, the stipes slender, about equaling the blades, densely clothed with spreading, ferruginous or yellowish brown, persistent, setiform scales; blades oblong or elliptic, 1.5–5 cm. long, 0.5–1.5 cm. broad, rounded-obtuse at apex, acute to narrowly long-cuneate at base; leaf-tissue variable with age and exposure, herbaceous, at length semiopaque, dull green, freely clothed with persistent, spreading, yellowish brown, setiform scales; veins evident by transmitted light, distant, oblique, simple or mostly once forked below the middle, not reaching the margin, the tips broadly clavate. Fertile fronds often several, 3–7 cm. long, long-stipitate; blades circular to oblong-ovate and acutish, 1–2 cm. long, 7–15 mm. broad, usually plane, the margins and ventral side setiform-paleaceous.

Rotten tree trunks and mossy banks, near Maricao, Porto Rico (Hess 213, 356):—Jamaica; Cuba; Guadeloupe; Martinique. Mexico to Brazil.

Closely allied to *E. horridulum* (Kaulf.) J. Smith, *E. Jamesoni* (Hook. & Grev.) Moore, and two or three other forms which are regarded as doubtful segregates of the Old World *E. spathulatum* (Bory) Moore. The whole series is admittedly variable and should receive monographic study.

2. *Elaphoglossum apodum* (Kaulf.) Schott, Gen. Fil. under *pl.* 14. 1834.

Acrostichum apodum Kaulf. Enum. Fil. 59. 1824.

Acrostichum platyneuron Fée, Mém. Foug. 2: 43. *pl.* 4, *f.* 1. 1845. Not L. 1753.

Elaphoglossum platyneuron Moore, Ind. Fil. 13. 1857.

Rhizome short, subglobose or horizontal, 1–4 cm. long, 1–2 cm. thick (scales excluded), copiously paleaceous; scales tufted, crispate-spreading, bright ferruginous, linear-attenuate, 6–12 mm. long, diaphanous, tortuous, sharply toothed. Sterile fronds numerous, subfasciculate, divaricate, 20–55 cm. long, the stipes 1–3 cm. long (or wanting), setaceo-paleaceous; blades narrowly linear-oblong-ovate, long-acuminate at apex, 2.5–5 cm. broad above the middle, thence evenly long-attenuate downward to the base, often curved; leaf-tissue light dull green, papyraceous or membrano-herbaceous, translucent, freely beset on both sides with spreading setiform castaneous scales (mostly 1–2 mm. long), these persistent beneath (especially from the flattish costa) and along the margins of the blade; veins evident, oblique-spreading, mostly once-forked, distant, excurrent quite to the narrow scarious border, the tips clavate. Fertile fronds solitary or often wanting, nearly exstipitate, similar to the sterile ones but smaller and narrower, the blades 10–30 cm. long, 5–15 mm. broad.

On stumps and the trunks of forest trees at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada. Eastern Guatemala; reported also from northern South America.

3. *Elaphoglossum erinaceum* (Fée) Moore, Ind. Fil. 9. 1857.

Acrostichum erinaceum Fée, Mém. Foug. 2: 41. 1845.

Rhizome ascending or decumbent, 4–6 cm. long, 2–3 cm. thick, sometimes subglobose, densely paleaceous; scales tufted, castaneous, thin, lustrous, linear-attenuate, 1–2 cm. long, denticulate, undulate-repand or often contorted. Sterile fronds several, cespitose, suberect, mostly 35–70 cm. long, the stipes one-fourth to half as long as the blades, pale brownish, finely squarrose-paleaceous, the scales dark brown, linear-setiform from a narrow cordate base, deciduous; blades lance-elliptic to linear-oblong, 22–50 cm. long, 4–8 cm. broad, acuminate-cuspidate at apex, abruptly acute or acutish at base; costa stout, pale, the lower side deciduously divaricate-paleaceous like the stipe; leaf-tissue light green, firmly chartaceous, at first very minutely punctate-paleaceous beneath, the thickened margins bearing also a dense double or triple row of dark brown, spreading scales, these abruptly subulate from a small deltoid base; veins barely evident, spreading, mostly once forked near the base, close, excurrent to the margin, the tips scarcely

enlarged. Fertile fronds mostly solitary, 25-45 cm. long, the stipes usually much longer than the blades, deciduously subulate-paleaceous; blades 10-17 cm. long, 2-3.5 cm. broad, similar in shape to the sterile ones, the rachis nearly or quite devoid of scales, the margins also naked.

Trunks of forest trees, Maricao, Porto Rico (*Hess 358*); rare:—Cuba; Guadeloupe. Mexico to Brazil.

Here presumably belong the Jamaica and Hispaniola plants reported as *E. scolopendrifolium* (Raddi) J. Smith. According to Underwood's unpublished notes *Sinten's 4624*, from Porto Rico, is *E. erinaceum*; this was first listed by Urban as *E. scolopendrifolium*, but was referred later to *E. latifolium* on the authority of Hieronymus.

4. **Elaphoglossum decoratum** (Kunze) Moore, Ind. Fil. 8. 1857.

Acrostichum decoratum Kunze, *Linnaea* 9: 25. 1834; Anal. Pter. 9. pl. 6. 1837.

Rhizome ascending, stout, 3-10 cm. long, 1-2 cm. thick (scales excluded), densely paleaceous; scales tufted, mostly lance-linear to filiform, 1.5-2.5 cm. long, subentire, light brown, thin, laxly repand-undulate or subcrispate. Sterile fronds few, fasciculate, suberect, 30-90 cm. long, the stipes stout, yellowish brown, sulcate ventrally, densely and broadly squarrose-paleaceous, the scales yellowish brown, thin, lustrous, mostly ovate-oblong, cordate at base, obtuse or acutish at apex, 6-12 mm. long, horizontal; blades linear-oblong, 20-55 cm. long, 6-13 cm. broad, abruptly short-acuminate at apex, roundish or evenly acute at base; costa stout, flattish, broadly sulcate ventrally, the dorsal side beset with reflexed imbricate scales, these similar to the stipe scales but smaller, disappearing toward the apex; leaf-tissue dark green, thick, coriaceous, sublustrous, at first minutely and distantly substellate-paleaceous beneath, the thickened margin bearing also a double row (ventral and dorsal) of small, thin, appressed, upwardly imbricate, roundish-cordate, yellowish brown scales; veins immersed but evident, oblique-spreading, mostly once forked near the base, excurrent to the margin, casually joined at the thickened tips. Fertile fronds solitary (or wanting), 30-50 cm. long; blades oblong-lanceolate, acuminate at apex, roundish at base, 12-32 cm. long, 3.5-6 cm. broad, devoid of imbricate scales.

Tree trunks and at the base of trees in wet forested ravines at middle elevations, Sierra de Naguabo, Porto Rico:—Jamaica; Hispaniola; Guadeloupe. Guatemala; Costa Rica to Bolivia and southern Brazil. Rare and local throughout its wide range.

5. **Elaphoglossum Herminieri** (Bory & Fée) Moore, Ind. Fil. xvi. 1857.

Acrostichum Herminieri Bory & Fée; Fée, *Mém. Foug.* 2: 43. pl. 11. 1845.

Rhizome short-creeping, stout, 4-10 cm. long, 1-2 cm. thick (scales excluded), enveloped in a thick covering of loosely matted or laxly spreading, fulvous scales, these narrowly linear or filiform, 2-4.5 cm. long, diaphanous, laxly tortuous, subundulate, bearing a few distant filiform teeth. Sterile fronds several, closely distichous, pendent, 30-95 cm. long, narrowly linear, 1.5-4 cm. broad at middle, attenuate at apex (the tip sharply acute), evenly long-attenuate and narrowly decurrent at base, essentially exstipitate; leaf-tissue very thick, opaque, rigidly coriaceous in drying, lustrous above, obscurely punctate-paleaceous on both sides, the scales minute, remote, stellate, subpersistent beneath; veins immersed, oblique-spreading, mostly 2 or 3 times forked, extending to the narrowly recurved cartilaginous border, scarcely enlarged at apex. Fertile fronds 1 or 2, 10-18 cm. long, nearly exstipitate, the blades broadly oblanceolate to pointed-oblong, 1.5-5 cm. broad.

Trunks of forest trees at lower and middle elevations, Porto Rico; infrequent:—Jamaica; Cuba; Hispaniola; Guadeloupe; Martinique; Trinidad. Guatemala to northern South America.

6. **Elaphoglossum flaccidum** (Fée) Moore, Ind. Fil. 356. 1862.

Acrostichum flaccidum Fée, *Mém. Foug.* 2: 35. pl. 7, f. 2. 1845.

Rhizome short-creeping or oblique, woody, 3-10 cm. long, 3-5 mm. thick, obscurely paleaceous; scales oblique, imbricate, dark brown, oblong-acuminate,

2-3 mm. long, thin, bearing a few distant, filiform, conspicuously gland-tipped teeth. Sterile fronds several or numerous, subfasciculate, ascending, 15-45 cm. long, nearly exstipitate; blades lance-linear, 2-4 cm. broad at middle, thence evenly narrowed to the long-acuminate apex, long-attenuate downward, decurrent at base, the stipe (1-4 cm. long) narrowly alate, flattish, scantily paleaceous; leaf-tissue thin-herbaceous or subchartaceous, translucent, very minutely punctate-paleaceous on both sides, the scales stellate, mostly few-celled, remote, subpersistent; veins evident, oblique-spreading, binate in origin or mostly once forked near the base, excurrent nearly to the thin, translucent, plane or lightly repand, cartilaginous border, the tips scarcely enlarged. Fertile fronds 1 or 2, usually a little shorter than the sterile ones, conspicuously long-stipitate; blades lance-linear, long-acuminate at apex, attenuate downward, 8-18 cm. long, 1-2.5 cm. broad.

Epiphytic in mountain forests at middle and higher elevations, Porto Rico;—Cuba; Hispaniola; Guadeloupe; Martinique; Trinidad. British and French Guiana. Reported also from St. Lucia and from Panama to Brazil.

7. **Elaphoglossum glabellum** J. Smith, Lond. Journ. Bot. 1: 197. 1842.

Acrostichum martinicense Fée, Mém. Foug. 2: 45. 1845, in part. Not Desv. 1811.

Acrostichum glabellum Klotzsch, Linnaea 20: 421. 1847.

Acrostichum durum Kunze, Linnaea 22: 575. 1849.

Acrostichum rigidum Fée, Crypt. Vasc. Brés. 2: 7. pl. 83, f. 1. 1872-73. Not Wall.; Hook. 1864.

Acrostichum simplex martinicense Jenman, Bull. Bot. Dept. Jamaica II. 5: 22. 1898.

Elaphoglossum simplex martinicense Urban, Symb. Ant. 4: 60. 1903.

Rhizome wide-creeping, flexuous, often freely branched, 1.5-2 mm. thick, woody, brown, scantily paleaceous, at length nearly naked; scales oblique, lance-deltoid, about 2 mm. long, thick, rigid, fuscous, lustrous, bearing a few short, slender, few-celled, gland-tipped teeth. Sterile fronds numerous, distichous, 5-10 mm. apart, rigidly erect, 18-35 cm. long, the stipes slender, mostly very short, canaliculate, stramineous, marginate, narrowly alate upward; phyllopodia 5-8 mm. long, dark brown, long-persistent; blades mostly 15-30 cm. long, 5-15 mm. broad, linear, evenly long-attenuate at apex, long-attenuate and narrowly decurrent at base, often broadly revolute; leaf-tissue thick-coriaceous, very rigid, bluish green above, obscurely punctate-paleaceous, the scales few and distant, minute, substellate, appressed, deciduous; veins concealed, very oblique, mostly once forked, extending to the narrow cartilaginous border, not enlarged at apex. Fertile fronds very few, half or two-thirds as long as the sterile, longer-stipitate; blades 8-12 cm. long, 5-11 mm. broad, linear or elliptic-linear, abruptly acute at apex, narrowly cuneate or attenuate at base.

Hato Grande, Monte Gregorio, Porto Rico (*Sinten's* 2704);—Jamaica; Cuba; Hispaniola; Martinique. Colombia to Bolivia and Brazil. A second Porto Rican collection listed by Urban (*Sinten's* 1804) has not been seen.

8. **Elaphoglossum Underwoodianum** Maxon, sp. nov.

Rhizome slender, wide-creeping, 10-20 cm. long, woody, 3-5 mm. thick (scales excluded), subflexuous, subpersistently paleaceous; scales laxly sub-squarrose, light rusty brown, thin, lance-linear, long-attenuate at apex, 5-8 mm. long, loosely attached just about the subcordate base, laxly fibrillose. Sterile fronds several, suberect, mostly 1-2 cm. apart (the phyllopodia stout, persistent, curved, light brown, 1-2 cm. long), mostly 20-55 cm. long, the stipes about equalling the blades, stoutish, pale brownish or dull reddish-stramineous, canaliculate, angulate, lightly marginate upward, nearly naked, the few scales minute, distant, appressed; blades elliptic-oblong, mostly 10-25 cm. long, 3-6 cm. broad, acutish or obtusely acuminate at apex, abruptly acute and short-decurrent at

base; leaf-tissue very rigid, opaque or nearly so, obscurely punctate-paleaceous beneath, the scales few, very remote, few-celled, appressed, evanescent; veins immersed, close, oblique-spreading, mostly once forked, excurrent almost to the closely revolute, cartilaginous margin, scarcely enlarged at apex, free. Fertile fronds very few, mostly 20–45 cm. long, the stipe equaling the blade, or much longer; blades linear to oblong-linear, 7–20 cm. long, 1.3–2.5 cm. broad, acuminate at apex (the tip sometimes subobtus), abruptly acute or rounded-acutish at base; sporangia extending quite to the narrowly revolute margin.

On tree trunks and rotten stumps, humid mountain forests at middle elevations, Porto Rico;—St. Eustatius; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; Grenada. Type from Maricao, Porto Rico, *Hess 352* (U. S. Nat. Herb. 759531).

Indicated by Underwood as undescribed, on the basis of small specimens from the Lesser Antilles which have been referred to *E. conforme*, *E. latifolium*, and other species. It is possible that these represent true *Acrostichum martinicense* Desv., but the type collection of this, from Martinique, has not been seen. In any case the name *martinicense* must apply to a plant of this general description rather than to the species with narrowly linear-attenuate fronds (*E. martinicense* of authors), which must be known as *E. glabellum* J. Sm.

9. ***Elaphoglossum rigidum*** (Aubl.) Urban, *Symb. Ant.* 9: 374. 1925.

Polypodium rigidum Aubl. *Pl. Guian.* 2: 963. 1775. Not Hoffm. 1795, nor Hook. & Grev. 1829.

Acrostichum longifolium Jacq. *Coll. Bot.* 2: 105. 1788. Not Burm. 1768.

Elaphoglossum longifolium J. Smith in Curtis's *Bot. Mag.* 72: Comp. 17. 1846.

Rhizome curved-ascending or short-creeping, 4–8 cm. long, 6–12 mm. thick or more, densely paleaceous at apex; scales broadly imbricate, ovate to lanceolate, long-acuminate, 6–11 mm. long, castaneous, thin but firm, subentire to erosely toothed. Sterile fronds several, very closely distichous, suberect, 35–85 cm. long, the stipes 5–15 cm. long, stout, sulcate, light castaneous, paleaceous, greenish-alate upward; blades pointed-ligulate to narrowly oblanceolate-linear, 30–70 cm. long, 4–9 cm. broad, rather abruptly long-acuminate at apex, evenly narrowed in the basal third, the extreme base narrowly cuneate to attenuate and long-decurrent; leaf-tissue rigidly thin-herbaceous, semitranslucent, freely punctate-paleaceous beneath, the scales remote, brown, irregularly stellate or subfilamentous, larger and subpersistent along the stout elevated rachis; veins evident, oblique-spreading, 1–3-forked, very close, excurrent to the irregularly repand, whitish-scarious border, their tips enlarged, transversely arcuate at one or both sides, often joined by a subcontinuous intramarginal venule thus formed. Fertile fronds very few, subapical, erect, 35–65 cm. long, the stipes 12–35 cm. long; blades similar to the sterile but narrower, 15–50 cm. long, 1.5–4 cm. broad.

On tree trunks and rotten logs in forests at middle and higher elevations, Porto Rico; not uncommon;—Cuba; Hispaniola; Guadeloupe; Montserrat; Martinique; Grenada. Various reported (as *E. longifolium*) from other West Indian islands and on the continent from Mexico to Bolivia, the whole series of specimens variable and probably including several closely allied species. The single Porto Rican specimen cited by Urban (as *E. longifolium*) has not been seen.

10. ***Elaphoglossum Dussii*** Underw., *sp. nov.*

Rhizome short-creeping, 2–6 cm. long, subcylindric, 5–8 mm. thick (scales excluded), densely divaricate-paleaceous; scales bright brown, lustrous, subacicular, 3–6 mm. long, often involute, subflexuous toward the delicate hair-pointed apex, bearing a few distant, deciduous, long, brown, usually rigid cilia. Sterile fronds numerous, closely distichous (the stout, brown, persistent phyllopodia about 1 cm. long, partly concealed by the rhizome scales), ascending or spreading, 20–65 cm. long, the stipes slender, half as long as the blades or less, subpersistently appressed-paleaceous, the scales substellate, dark; blades linear, 18–45 cm. long, 1.5–3 cm. broad, attenuate and narrowly long-acuminate at apex, attenuate downward, narrowly cuneate at base but not decurrent; leaf-tissue chartaceo-herbaceous to coriaceous, semitranslucent, minutely and deciduously paleaceous on both sides, the scales of the upper side whitish, diaphanous,

roundish, fimbriate, those of the under side darker, subdistant, deeply stellate from a minute punctiform base, the scars sometimes appearing resinous-glandular; veins oblique-spreading, mostly once forked, close, not reaching the slightly cartilaginous, revolute border, the tips clavate. Fertile fronds few, often equaling the sterile ones, long-stipitate; blades narrowly linear, 12–35 cm. long, 4–7 mm. broad, long-attenuate in both directions, narrowly acute or occasionally short-decurrent at base.

On logs and trunks of forest trees, at middle and higher elevations, Porto Rico:—Hispaniola; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada. Type from Martinique, *Duss* 4688 (herb. N. Y. Bot. Garden).

Listed from Porto Rico by Urban (on *Sintenis* 803) as *E. petiolatum* (Sw.) Urban, with which species it has been very generally confused. It is almost certainly the Martinique plant of Plumier's plate 129, which is the type of *Acrostichum Plumieri* Desv., 1827; but the use of this species name for the present plant is made impossible by *Elaphoglossum Plumieri* (Fée) Moore, 1857 (a transfer of *Acrostichum Plumieri* Fée, 1845), which is a doubtful species described from Hispaniola on Plumier's plate 127.

11. *Elaphoglossum pteropus* C. Chr. Ind. Fil. 314. 1905.

Acrostichum alatum Fée, Mém. Foug. 2: 35. pl. 5, f. 2. 1845. Not Roxb. 1844.

Elaphoglossum alatum Moore, Ind. Fil. xvi. 1857. Not Gaud. 1846.

Rhizome cylindrical, creeping, 5–12 cm. long, 5–12 mm. thick, often with short divergent branches, enveloped in a mass of imbricate-spreading, fulvous scales, these linear-attenuate, diaphanous, hair-pointed, bearing several long, filiform, tortuous, gland-tipped teeth. Sterile fronds several, closely distichous, erect, mostly 15–45 cm. long, the slender stramineous stipes nearly or quite equaling the blades (the phyllopodia brown, 6–10 mm. long); blades variable, lanceolate or linear-lanceolate to pointed-elliptic, mostly 10–25 cm. long, 2.5–4.5 cm. broad, acute or acuminate at apex, acute at base and abruptly decurrent (1–4 cm.) as a narrow wing upon the upper stipe; leaf-tissue coriaceous or thick-chartaceous, pale green, semitranslucent, minutely punctate-paleaceous on both sides (chiefly beneath), the scales few, distant, substellate, consisting of a few turgid cells; veins immersed, oblique-spreading, 1–3-forked, close, excurrent to the closely revolute cartilaginous border, scarcely enlarged at apex. Fertile fronds smaller than the sterile, long-stipitate; blades 5–8 cm. long, 1.5–3 cm. broad, lance-elliptic to oblong, bluntly acutish at apex, roundish-subtruncate or very broadly cuneate at base, below this the leaf-tissue abruptly short-decurrent.

Tree trunks and rotten logs in mountain forests at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Montserrat; Tobago. British and French Guiana.

Of the five *Sintenis* numbers listed from Porto Rico by Urban under *E. simplex* (Sw.) Schott, two (1805, 4724) pertain to this species; the others have not been examined.

12. *Elaphoglossum firmum* (Mett.) Urban, Symb. Ant. 4: 59. 1903.

Acrostichum firmum Mett.; Kuhn, Linnaea 36: 55. 1869.

Acrostichum viridifolium Jenman, Journ. Bot. Brit. & For. 24: 273. 1886.

Elaphoglossum viridifolium C. Chr. Ind. Fil. 318. 1905.

Rhizome creeping, 5–15 cm. long, 5–10 mm. thick, subflexuous, copiously paleaceous; scales laxly imbricate-spreading, ferruginous or darker, lance-linear, attenuate, 6–10 mm. long, thin, tortuous toward apex, bearing a few distant, filiform teeth or gland-tipped cilia. Sterile fronds several, closely distichous, erect, 20–50 cm. long, distinctly stipitate (2–15 cm.); blades usually linear-oblancoate, 18–40 cm. long, 2–4.5 cm. broad, long-acuminate at apex (the tip sometimes obtuse), long-attenuate downward, the stramineous stipe narrowly alate above, marginate toward the base; leaf-tissue rigidly coriaceous, opaque, minutely punctate-paleaceous (mainly beneath), the scales few, remote, appressed, deeply stellate; veins barely evident, oblique-spreading, decurved at base, mostly once forked, close, excurrent to the recurved cartilaginous border, somewhat enlarged

at apex. Fertile fronds few, as long as the sterile ones or exceeding them, the stipes longer and the blades much narrower.

On logs and forest tree trunks at middle elevations, Porto Rico:—Jamaica; Cuba.

Here belongs *Sintenis* 4098, which is one of five numbers listed from Porto Rico by Urban under *E. latifolium* (Sw.) J. Smith. The two *Sintenis* numbers (1802b, 1803b) cited as *E. firmum* have not been examined.

Elaphoglossum brevipes (Kunze) Moore, a critical species founded on cultivated material, is reported from Porto Rico by Urban on a single specimen (*Sintenis* 4465), which has not been examined by the writer.

Elaphoglossum gramineum (Jenman) Urban is reported from Porto Rico by Urban on the basis of *Eggers* 1124, which has not been seen by the writer. The species is known otherwise only from Jamaica, where it is rare.

Elaphoglossum latifolium (Sw.) J. Smith, a Jamaican species listed from Porto Rico by Urban, probably does not occur on the island. Of the five *Sintenis* numbers cited, the single specimen seen (4098) is *E. firmum* (Mett.) Urban; the others may pertain to this species or to *E. rigidum* (Aubl.) Urban.

2. **HYMENODIUM** Fée, Mém. Foug. 2: 20. 1845.

Rhizome short, thick, woody, densely paleaceous. Fronds articulate, subcespitose, stipitate, barbate-paleaceous throughout, the blades simple and entire, carnose; costa percurrent. Veins equal, divergent from the costa, completely anastomosing, the areoles narrowly elongate, rectangular to hexagonal, without included venules. Sporophylls conform but smaller, the parenchyma completely sporangiferous beneath. (Greek, alluding to the membranous young fronds). Type and sole species: *Acrostichum crinitum* L.

1. **Hymenodium crinitum** (L.) Fée, Mém. Foug. 2: 90. 1845.

Acrostichum crinitum L. Sp. Pl. 2: 1068. 1753.

Dictyoglossum crinitum J. Smith in Curtis's Bot. Mag. 72: Comp. 18. 1846.

Chrysodium crinitum Mett. Fil. Hort. Lips. 21. 1856.

Elaphoglossum crinitum Christ, Monogr. Elaph. 102. 1899.

Rhizome decumbent, 3–5 cm. thick, the apex bearing a tuft of thin filiform tortuous golden scales. Fronds several, ascending, 40–90 cm. long, the stipes shorter than the blades, stramineous to brown, densely barbate-paleaceous, the scales horizontal or retrose, 1–1.5 cm. long, dark brown to deep atropurpureous, lustrous, abruptly capillary from a short deltoid-ovate base, deciduous; blades oval to elliptic-oblong, 25–60 cm. long, 12–25 cm. broad, rounded-obtuse or broadly acutish at apex, roundish-truncate or subcordate at base, the broad costa, margins, and surfaces deciduously barbate-paleaceous like the stipe; leaf-tissue repand, thick-chartaceous and dark gray-green in drying. Sporophylls long-stipitate, the blades half as long as the sterile ones.

Rocks, tree trunks, and rich humus-covered forest slopes, Porto Rico, at middle and higher elevations:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Lucia; St. Vincent; Grenada; Trinidad. Costa Rica. Ascribed also to Mexico.

3. **RHIPIDOPTERIS** Schott, Gen. Fil. under *pl.* 14. 1834.

Small epiphytic forest ferns, the rhizomes wide-creeping, paleaceous. Fronds non-articulate, erect, distant, stipitate, sparsely paleaceous, dimorphous. Blades of sterile fronds reniform in outline, 1 to several times dichotomously divided, usually flabellate-multifid, the veins free. Blades of fertile fronds suborbicular,

crenate to palmately lobed, promiscuously sporangiferous beneath, the venation free, flabelliform. (Greek, fan-fern, alluding to the radiating segments or veins.) Species 2 or 3, tropical American. Type species: *Acrostichum peltatum* Sw.

1. **Rhipidopteris peltata** (Sw.) Schott, Gen. Fil. under *pl.* 14. 1834.

Osmunda peltata Sw. Prodr. 127. 1788.

Acrostichum peltatum Sw. Journ. Bot. Schrad. 1800²: 11. 1801.

Acrostichum foeniculaceum Hook. & Grev. Icon. Fil. 1: *pl.* 119. 1829.

Rhipidopteris foeniculacea Schott, loc. cit.

Elaphoglossum peltatum Urban, Symb. Ant. 4: 61. 1903.

Elaphoglossum foeniculaceum C. Chr. Ind. Fil. 307. 1905.

Plants colonial, the interlacing rhizomes filiform, greenish, sulcate; scales relatively large, thin, ferruginous, oblique, laxly imbricate, lanceolate. Sterile fronds 3–15 cm. long, the stipes much longer than the blades, slender, distantly paleaceous throughout; blades reniform, 2.5–5 cm. broad, 1.5–3.5 cm. long, 4–6 times dichotomously divided, the main divisions flabellate-radiate, the ultimate segments oblique, linear, 0.5–1.5 mm. broad, acutish, unicostate, distantly paleaceous beneath, firmly herbaceous. Fertile fronds longer than the sterile, the stipes filiform, stramineous; blades 5–20 mm. broad and long, the broadly scarious margins naked, erose-dentate.

On tree trunks, logs, and wet mossy rocks, often along streams, in forests at middle and higher elevations, Porto Rico:—Jamaica; Cuba, Hispaniola; Guadeloupe; Dominica; Martinique. Mexico to northern South America.

4. **ACROSTICHUM** L. Sp. Pl. 1067. 1753.

Tall coarse swamp ferns, the rhizomes erect, paleaceous, copiously rooting, often forming massive tussocks. Fronds cespitose, non-articulate, erect, naked, stipitate, the blades elongate, simply pinnate. Veins completely anastomosing, the areoles uniform, minute, elongate-hexagonal, without included venules. Sporangia superficial, borne promiscuously as a dense under covering of the conform apical pinnae or of all the pinnae of certain fronds, at first obscured by the very numerous paraphyses; indusia wanting. (Greek, alluding to the apical fertile pinnae of the historic species.) Species 4 or 5, of wide distribution. Type species: *Acrostichum aureum* L.

Fertile blades with only the upper pinnae fertile; pinnae few, apart, thick-coriaceous, the areoles oblique; paraphyses minute, capitate-stellate.

Fertile blades with all the pinnae fertile; pinnae numerous, imbricate, chartaceous, the areoles divergent; paraphyses large, allantoid.

1. *A. aureum*.

2. *A. daneaefolium*.

1. **Acrostichum aureum** L. Sp. Pl. 1069. 1753.

Chrysodium aureum Mett. Fil. Hort. Lips. 21. 1856.

Fronds erect, 1.5–3 m. long, the stipes much shorter than the blades, subterete, pale, lustrous, bearing several alternate indurated spurs; blades linear, 1–2 m. long, 20–40 cm. broad, obtuse or acutish at apex; pinnae few, alternate, subdistant, oblique, stalked, 10–14 on either side and a terminal conform one, elliptic-ligulate, 15–30 cm. long, 3–6 cm. broad, rounded-obtuse at apex, emarginate or short-apiculate, cuneate at base; leaf-tissue light green, rigidly coriaceous, the margins cartilaginous, revolute; areoles oblique; 1–4 pairs of apical pinnae fertile, the sporangia with numerous minute capitate-stellate paraphyses intermingled.

Mangrove swamps and low coastal marshes and thickets, Porto Rico; Vieques:—Jamaica; Cuba; Bahamas; Hispaniola; Martinique; Grenada; Barbados; Trinidad. Florida; Mexico to Paraguay. Widely distributed in the Old World tropics, as currently understood. Reported also from several other West Indian islands, the specimens perhaps pertaining to the next species.

2. **Acrostichum daneaeifolium** Langsd. & Fisch. Icon. Fil. 1: 5. pl. 1. 1810.

Chrysodium lomarioides Jenman, Timehri 4: 314. 1885.

Acrostichum lomarioides Jenman, Bull. Bot. Dept. Jamaica II. 5: 154. 1898.
Not Bory, 1833.

Acrostichum excelsum Maxon, Proc. Biol. Soc. Washington 18: 224. 1905.

Sterile fronds suberect, 1.5–3.5 m. long, the stipes shorter than the blades, very stout, deeply ridged; blades linear, 1–2.5 m. long, 25–60 cm. broad, narrowed at base, abruptly rounded or acutish at apex, or subtruncate; rachis subquadrangular, very stout, deeply ridged beneath, sulcate above; pinnae very numerous, the lower ones far distant, subopposite, short-stalked, the middle ones close or crowded, nearly sessile, lance-linear to ligulate, 15–40 cm. long, 3–5 cm. broad, broadly cuneate at base, acute or acutish at apex; upper pinnae semi-adnate below, abruptly discontinuous, the terminal one usually not distinct; leaf-tissue chartaceous, often finely pubescent beneath and semitranslucent, the margins lightly repand-cartilaginous; areoles oblique-spreading. Fertile fronds taller, rigidly erect, the stipe and rachis stouter, dark castaneous; pinnae carnosae, inserted transversely, crowded, strongly imbricate in drying; paraphyses large, allantoid.

Brackish marshes at sea-level, also about springs and water-courses at lower elevations, Porto Rico; Vieques; Tortola; St. Thomas; St. Croix:—Jamaica; Cuba; Bahamas; Bermuda; Hispaniola; Antigua; Guadeloupe; Montserrat; Martinique; Grenada; Trinidad; Tobago. Florida; Mexico to Paraguay.

5. **ANETIUM** Splitg. Tidjsch. Nat. Gesch. 7: 395. 1840.

A lax epiphyte of wet forests, the rhizome dorso-ventral, fleshy, slender and wide-creeping, densely clothed with delicate clathrate scales. Fronds not jointed to the rhizome, pendent, elongate, simple, nearly or quite exstipitate, entire, the costa not quite percurrent. Venation reticulate, the areoles numerous, elongate-hexagonal (without included veins), slightly oblique, the small outermost row incomplete. Sporangia borne intermittently in groups upon the parenchyma within the areoles and less abundantly in groups upon the veins, superficial, minute, deciduous. Indusia wanting. (Greek, the significance not clear.) Type and sole species: *Acrostichum citrifolium* L.

1. **Anetium citrifolium** (L.) Splitg. Tidjsch. Nat. Gesch. 7: 395. 1840.

Acrostichum citrifolium L. Sp. Pl. 1067. 1753.

Hemionitis parasitica L. Syst. Nat. ed. 10, 2: 1322. 1759.

Antrophyum citrifolium Fée, Mém. Foug. 4: 51. 1851–52.

Antrophyum pendulum Leprieur; Fée, loc. cit.

Rhizome 10–30 cm. long, 2–4 mm. thick, with copious brown feltlike roots; scales laxly imbricate, brownish in mass, lance-attenuate, transparent, highly iridescent. Fronds adjacent or apart, usually exstipitate, variable, sometimes elliptic-oblong, prevailing oblongate, acute or acuminate at apex, and evenly narrowed downward from the apical third, 10–40 cm. long, 2.5–7 cm. broad; leaf-tissue punctate, carnosae-herbaceous, chartaceo-coriaceous in drying, the course of the veins commonly evident on one or both sides.

On trunks of forest trees, rarely on wet rocks, at middle elevations, Porto Rico:—Jamaica; Hispaniola; Guadeloupe; Montserrat; Martinique; St. Vincent; Grenada; Trinidad; Tobago. Guatemala to northern Brazil.

6. **VITTARIA** J. E. Smith, Mém. Acad. Turin 5: 413. pl. 2. 1793.

Epiphytic ferns of small or medium size, the rhizomes erect or short-creeping, often massed, densely clathrate-paleaceous. Fronds several to very numerous,

ascending to laxly pendent, close, distichous or radial, not articulate, narrowly linear, simple and entire, the costa percurrent. Venation reticulate, the lateral veins usually distant and oblique, joined at their extremity by a continuous intramarginal vein, a single row of simple areoles thus formed at each side of the costa. Sporangia dorsal upon the intramarginal vein, borne in a continuous line, superficial to deeply immersed; spores diplanate or triplanate; paraphyses usually present. (Latin, alluding to the very narrow, ribbon-like form of the fronds). About 50 species, tropical and subtropical, of both hemispheres. Type species: *Pteris lineata* L.

Fronds pendent, 1–3 mm. broad; sori borne in deep grooves.

Rhizome scales dark brown, with long filiform tips, these unicostate; spores diplanate.

Rhizome scales yellowish brown or castaneous, attenuate, pluricostate almost to the tip; spores triplanate.

Fronds suberect, 5–18 mm. broad; sori nearly superficial.

1. *V. lineata*.

2. *V. filifolia*.

3. *V. remota*.

1. **Vittaria lineata** (L.) J. E. Smith, Mém. Acad. Turin 5: 413. pl. 9, f. 5. 1793.

Pteris lineata L. Sp. Pl. 1073. 1753.

Vittaria filiformis Cav. Descr. Pl. 270. 1802.

Vittaria angustifrons Michx. Fl. Bor. Amer. 2: 261. 1803.

Vittaria Schkuhrrii Raddi, Pl. Bras. 1: 51. 1825.

Rhizomes short-creeping, branched, closely multicapital, conspicuously paleaceous, the scales dark brown in mass, highly iridescent, linear, attenuate-filiform, the capillary tip with a single, flexuous, heavily sclerotic, percurrent costa. Fronds very numerous, tufted, pendent, narrowly linear, 0.3–1.3 m. long, 2–3 mm. broad, slightly narrowed at base, exstipitate, broadly sulcate ventrally, the margin thick and rounded; lateral veins short, distant, the areoles thus linear, longitudinal; sori continuous, very narrow, sunk in a deep groove overlying the intramarginal vein, at first wholly concealed; spores reniform, smooth; paraphyses branched, cylindric, the end cells enlarged, curved, brown. Leaf-tissue dark green, thick, pliable, and glossy in the living plant, opaque and herbaceous in drying.

On logs and tree trunks, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Bahamas; Hispaniola; Guadeloupe; Martinique; Grenada; Trinidad; Tobago. Florida; Mexico to Paraguay. Reported also from St. Eustatius, St. Kitts, Dominica, and St. Vincent. GRASS-FERN.

2. **Vittaria filifolia** Fée, Mém. Foug. 3: 20. pl. 3, f. 6. 1851–52.

? *Vittaria graminifolia* Kaulf. Enum. Fil. 192. 1824.

Rhizomes short-creeping, sometimes tufted; scales yellowish brown to castaneous, slightly iridescent, lance-attenuate, pluricostate nearly to the extreme tip, the partition cell-walls moderately sclerotic. Fronds few or numerous, tufted, pendent, narrowly linear, 10–40 cm. long, 1–3 mm. broad, exstipitate, sulcate anteriorly or not, the costa elevated beneath; areoles linear, longitudinal; sori immersed, the grooves deep but open, often extending nearly to the base of the blade; spores triplanate. Leaf-tissue thick and pliable in the living plant, herbaceous and sometimes semitranslucent in drying.

Wooded slopes, on rocks, logs, and tree trunks, at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Montserrat. Mexico to southern Brazil. Ascribed to Grenada.

3. **Vittaria remota** Fée, Mém. Foug. 7: 26. pl. 20, f. 1. 1857.

Rhizome erect, 1–3 cm. long, about 5 mm. thick; scales brown, lance-deltoid, the median cell-walls greatly thickened. Fronds several, cespitose, suberect, 10–40 cm. long, the very short stipe (1–5 cm.) purplish brown, flattish upward,

passing insensibly into the blade; blades linear, 5–18 mm. broad at middle, evenly long-attenuate both ways or more gradually downward, the costa raised above and beneath toward the base, dark castaneous, concealed elsewhere, its course evident as a whitish line; lateral veins very long, the elongate areoles thus divergent from the costa; sori nearly superficial, very dark brown, broad, 0.5–1 mm. distant from the thin plane margin, slightly undulate, extending from near the apex to the middle or lower third of the blade. Leaf-tissue bright green, herbaceo-chartaceous in drying, semitranslucent.

Rotten logs and trunks of forest trees, at middle and higher elevations, Porto Rico:—Jamaica; Hispaniola. Costa Rica to Venezuela.

7. **ANANTHACORUS** Underw. & Maxon, Contr. U. S. Nat. Herb. 10: 487. 1908.

A small pendent epiphytic fern, the rhizome short-creeping, densely clothed with narrow clathrate scales, bearing masses of brown-tomentose roots. Fronds numerous, dorsal, narrowly linear, simple and entire, exstipitate, the costa percurrent, concealed. Venation wholly areolate, without free veinlets, the areoles narrowly elongate, hexagonal or pentagonal, of equal rank, arranged in several rows at either side of the costa and parallel to it. Sori nearly superficial, linear, borne in a continuous or subcontinuous intramarginal line at the outer border of the outermost row of areoles, paraphysate, exindusiate; spores diplanate. (Greek, signifying flowerless sweet-flag.) Type and sole species: *Pteris angustifolia* Sw.

1. **Ananthacorus angustifolius** (Sw.) Underw. & Maxon, Contr. U. S. Nat. Herb. 10: 487. 1908.

Pteris angustifolia Sw. Prodr. 129. 1788.

Taenitis angustifolia Spreng. Syst. Veg. 4: 42. 1827.

Pteropsis angustifolia Desv. Mém. Soc. Linn. Paris 5: 218. 1827.

Vittaria angustifolia Baker in Mart. Fl. Bras. 1²: 544. 1870.

Rhizome 5–10 cm. long; scales imbricate-tufted, linear-filiform, thin, reddish-brown, iridescent. Fronds numerous, adjacent, 15–55 cm. long, 8–18 mm. broad, evenly long-attenuate both ways or more gradually downward, straight or often falcate, entire, light green, spongiouse-chartaceous (or subcoriaceous in drying), sometimes involute; venation concealed; sporangial lines dark brown, 1–2 mm. broad, often extending nearly to the tip.

Trunks of forest trees, usually along streams, at middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Martinique; St. Vincent; Grenada; Trinidad. Mexico to Bolivia and Brazil.

8. **HECISTOPTERIS** J. Smith, Lond. Journ. Bot. 1: 193. 1842.

A minute epiphytic fern of mosslike appearance, the rhizomes filiform, creeping, laxly imbricate-paleaceous, the scales delicate, attenuate, clathrate, highly iridescent. Fronds borne in distant fascicles, ascending, simple, nearly exstipitate, cuneiform, ecostate, dichotomously cleft or dissected. Venation free, flabellate-dichotomous, the branches delicate, subequal. Sori linear, dorsal upon the ultimate and penultimate vein-branches, superficial, paraphysate, non-indusiate. (Greek, alluding to the small size.) Type and sole species: *Gymnogramma pusilla* Spreng.

1. **Hecistopteris pumila** (Spreng.) J. Smith, Lond. Journ. Bot. 1: 193. 1842.

Gymnogramma pumila Spreng. Tent. Suppl. Syst. Veg. 31. 1828.

Fronds few, thin-herbaceous, cuneiform, 1–2 cm. long, narrowly long-attenuate downward, 2–10 mm. broad toward the apex, here sharply fimbriate-dentate to several times dichotomously cleft or dissected, the penultimate divisions about 1 mm. broad, the ultimate lobes very narrow, acute; sori densely paraphysate, confluent laterally with age. •

On tree trunks and rotten logs, mixed among mosses, in mountain forest, Indiera Fria, Porto Rico (Britton, Cowell & Brown 4444):—Cuba; Hispaniola; Guadeloupe; Trinidad. Mexico to Brazil.

9. **POLYTAENIUM** Desv. Mém. Soc. Linn. Paris **6**: 218. 1827.

Small pendent epiphytes of wet forests, the rhizomes short-creeping, often tufted, densely clathrate-paleaceous. Fronds closely distichous, not jointed to the rhizome, simple and entire, elongate, exstipitate, the costa percurrent. Venation reticulate, the areoles elongate, simple, uniform, without included veinlets, arranged in 2 or several rows at either side of the costa, longitudinal or oblique. Sori indefinite, superficial or immersed, borne dorsally in lines upon some or all of the veins, elongate-linear and disconnected to completely areolate in pattern; spores triplanate; paraphyses wanting. (Greek, many furrows, alluding to the deep sporangial rows in the type species.) About 10 species, all tropical American, differing from the Old World genus *Antrophyum* in their completely costate blades. Type species: *Hemionitis lineata* Sw.

Sporangia immersed, borne in several parallel longitudinal lines.

Sporangia superficial, borne in irregular, flexuous or branched lines.

1. *P. lineatum*

2. *P. Feei*.

1. **Polytaenium lineatum** (Sw.) J. Smith, Journ. Bot. Hook. **4**: 68. 1841.

Hemionitis lineata Sw. Prodr. 129. 1788.

Vittaria lanceolata Sw. Ges. Naturf. Freund. Berlin Neue Schrift. **2**: 133. pl. 7, f. 2. 1799.

Antrophyum lineatum Kaulf. Enum. Fil. 199. 1824.

Polytaenium lanceolatum Desv. Mém. Soc. Linn. Paris **6**: 218. 1827.

Rhizomes short; scales loosely tufted, lance-attenuate, thin, pale, iridescent. Fronds numerous, subfasciculate, narrowly ligulate, 15–40 cm. long, 5–15 mm. broad, attenuate both ways or more gradually downward, straight or subfalcate, carnose, rigidly herbaceous in drying; costa evident beneath throughout; main veins longitudinal, 2–4 at either side of the costa, connected distantly by short transverse veins, the areoles thus narrowly linear; sporangia borne in deep grooves, the lines elongate, 2–4 at each side of the costa, simple, continuous, or the outer ones interrupted.

Trunks of forest trees in moist mountain ravines, Porto Rico, at middle elevations; rare:—Jamaica; Cuba; Hispaniola. Mexico to Bolivia and Brazil. Reported from St. Thomas and Guadeloupe, probably through misidentification of the next species.

2. **Polytaenium Feei** (Schaffn.) Maxon.

Hemionitis lanceolata L. Sp. Pl. 1077. 1753.

Antrophyum lanceolatum Kaulf. Enum. Fil. 198. 1824.

Antrophyum Feei Schaffn.; Fée, Mém. Foug. **7**: 42. pl. 22, f. 1. 1857.

Dictyogramme lanceolata Trev. Atti Ist. Veneto V. **3**: 592. 1877.

Polytaenium lanceolatum Benedict, Bull. Torrey Club **38**: 169. 1911. Not Desv. 1827.

Rhizomes short, usually in dense masses, with copious brown feltlike roots; scales lance-attenuate, brownish, at first somewhat iridescent. Fronds numerous, subfasciculate, linear, 20–55 cm. long, 1–2 cm. broad at or above the middle, attenuate upward, long-attenuate downward, carnose, membrano-

herbaceous in drying; costa evident beneath throughout, carinate toward the base; areoles elongate, pentagonal or hexagonal, in 3 or 4 parallel rows at each side of the costa, the veins equal; sporangia superficial, borne in flexuous branched longitudinal lines, these never wholly reticulate in pattern.

Rocks and tree trunks in wet forested ravines, at lower to higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; Grenada; Trinidad. Mexico to northern South America. Reported from St. Lucia and St. Vincent.

Antrophyum cayennense (Desv.) Kaulf. is ascribed to Porto Rico by Urban on a single collection (*Sintenis 6354*), which has not been seen. For several reasons the identification must be regarded as very doubtful.

10. **PALTONIUM** Presl, Epim. Bot. 156. 1851.

Epiphytic, the rhizomes short-creeping, paleaceous. Fronds articulate, narrowly elongate, simple and entire, conform, rigid, narrowly callous-marginate; costa percurrent. Veins deeply immersed, anastomosing, the areoles elongate-hexagonal, mostly with a simple or divaricate-furcate included venule, oblique, arranged in several rows, the outermost small and incomplete. Sori linear, intramarginal, non-indusiate, the receptacle continuous, borne along the outer side of the outermost areoles; spores diplanate. (Greek, alluding to the lance-shaped blades). Species 2, one a native of Asia. Type species: *Pteris lanceolata* L.

1. **Paltonium lanceolatum** (L.) Presl, Epim. Bot. 156. 1851.

Pteris lanceolata L. Sp. Pl. 1073. 1753.

Taenitis lanceolata Kaulf. Enum. Fil. 130. 1824.

Pteropsis lanceolata Desv. Mém. Soc. Linn. Paris 6: 218. 1827.

Neurodium lanceolatum Fée, Mém. Foug. 3: 28. 1851–52.

Heteropteris lanceolata Diels in Engl. & Prantl, Pflanzenfam. 14: 305. 1899.

Rhizomes densely brown-tomentose; scales small, imbricate, deltoid-ovate, dark brown. Fronds numerous, rigidly ascending, 20–40 cm. long, the stipe short (1–5 cm.), light brown, narrowly alate upward; blades rigidly coriaceous, bright green, lustrous, linear-lanceolate, 1.5–4 cm. broad at middle, long-attenuate both ways, the fertile apical half or third sometimes subcaudate; costa elevated; margins repand; sori 2–3 mm. broad, extending almost to the obtuse tip.

On tree trunks, rarely on rocky banks, at lower and middle elevations, Porto Rico; Vieques; St. Thomas; Virgin Gorda:—Jamaica; Cuba; Bahamas; Hispaniola; St. Eustatius; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Barbados. Also Florida and Honduras.

11. **COCHLIDIUM** Kaulf. Berlin. Jahrb. Pharm. 21: 36. 1820.

(PLEUROGRAMME Presl, Tent. Pter. 223. 1836.)

Small epiphytic ferns, the rhizomes relatively stout, woody, paleaceous. Fronds articulate, rigid, linear, simple or bifurcate, plane throughout or the upper (fertile) portion shallowly to very deeply concave beneath. Venation free, the costa percurrent, strongly sclerotic, concealed by parenchyma; veins simple, oblique, decurrent, or rarely wanting upward. Sori linear, exindusiate, consisting of a line of sporangia borne closely against the costa at either side, the double line early confluent, sometimes intermittent. (Greek, diminutive of snail.) Species 6 or 7, tropical American. Type species: *Grammitis graminoides* Sw., known only from Jamaica.

Fronds 2-8 cm. long, 1-2 mm. broad above the middle, the margins often sinuous.

Fronds 8-20 cm. long, 2-5 mm. broad at middle, entire.

1. *C. minus*.

2. *C. seminudum*.

1. *Cochlidium minus* (Jenman) Maxon.

Monogramma minor Jenman, Bull. Bot. Dept. Jamaica II. 4: 212. 1897.

Gregarious. Rhizomes erect, 1-3 cm. long, 2-5 mm. thick, with numerous fine wiry roots; scales apical, loosely tufted, yellowish-brown, oblong-lanceolate, thickish, entire. Fronds numerous, closely imbricate-cespitose, ascending to rigidly erect, exstipitate, 2-8 cm. long, linear, 1-2 mm. broad in the upper part, sometimes forked, rounded-obtuse at apex, narrowly attenuate in the basal half, straight or falcate, entire or sinuate, subcoriaceous, the costa subflexuous, its course evident ventrally as a strong median ridge; veins few, distant, very oblique, simple; sori confined to the apical third or half, superficial, broadly confluent, nearly covering the flat unaltered blade, rarely discontinuous and polypodioid.

Among thickly tufted mosses, on wet rocky banks and tree trunks, at higher elevations, Porto Rico:—Jamaica; Cuba.

2. *Cochlidium seminudum* (Willd.) Maxon.

Blechnum seminudum Willd. Phytogr. 13. pl. 8, f. 2. 1794.

Taenitis linearis Kaulf. Enum. Fil. 131. 1824.

Taenitis pumila Kaulf. loc. cit.

Taenitis graminifolia Hook. Exot. Fl. 2: pl. 77. 1825.

Micropteris blechnoides Desv. Mém. Soc. Linn. Paris 6: 217. 1827.

Pleurogramme linearis Presl, Tent. Pter. 223. pl. 10, f. 2. 1836.

Pleurogramme pumila Presl, Tent. Pter. 223. 1836.

Pleurogramme graminifolia Presl, loc. cit.

Monogramma graminifolia Hook. Sp. Fil. 5: 125. 1864.

Monogramma seminuda Baker in Hook. & Baker, Syn. Fil. 375. 1868.

Pleurogramme seminuda J. Smith, Hist. Fil. 178. 1875.

Rhizome erect or curved-ascending, 1-3 cm. long, 3-6 mm. thick, with fine wiry roots; scales apical, tufted, yellowish-brown, lance-attenuate, thickish, entire. Fronds numerous, closely imbricate-cespitose, suberect, nearly exstipitate, 8-20 cm. long, linear, 2-5 mm. broad at middle, attenuate both ways (the apex obtuse), entire, straight or subfalcate (occasionally recurved), subcoriaceous, the costa covered by parenchyma, its course evident ventrally as a pronounced median ridge; veins numerous, close, oblique, simple, the clavate tips distant from the thin plane margin; sori extending half-way to the base or less, early confluent, superficial, but the fertile area shallowly concave, the blade not conduplicate.

On logs and tree trunks, at middle and higher elevations, Porto Rico:—Jamaica; Hispaniola; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad. Northern South America.

12. *POLYPODIUM* L. Sp. Pl. 1082. 1753.

Small to large, mainly epiphytic ferns of varied habit, the rhizomes paleaceous, usually slender and creeping. Fronds uniform or subdimorphous, pendent to erect, usually articulate to knoblike prominences of the rhizome; blades simple, 1-3 pinnate or variously pinnatifid, glabrous, pubescent, or paleaceous; veins free or variously areolate. Sori round to elliptical, large, dorsal upon the veinlets or rarely terminal, nonindusiate, often conspicuously paraphysate. (Greek, many feet, alluding to the numerous knoblike prominences of the rhizome.) Several hundred species, mainly of tropical and subtropical regions. Type species: *Polypodium vulgare* L.

- A. Veins free (casually joined in no. 4).
 Blades simple and entire, the margins dark-sclerotic.
 Blades serrate or lobed to pinnatisect, at least below, the margins not dark-sclerotic.
1. Sori confluent along the rachis, confined to the caudiform apex.
 Rhizomes filiform; sterile blades serrate or acutely incised.
 Rhizome erect; sterile blades obtusely pinnatifid.
 2. Sori distinct, not borne in a confluent apical line.
 - a. Blades crenately lobed half-way to the rachis or less, spongy.
 - b. Blades pinnatisect or nearly so, not spongy.
 - *Segments monosorous.
 - **Segments bearing several pairs of sori.
 - †Veins simple or with a rudimentary fertile spur.
 - Blades decurved at base; fertile veins gibbous, the sori dorsal.
 - Blades not decurved; fertile veins straight, the sori terminal.
 - Sori deeply impressed.
 - Sori superficial.
 - Fronds pendent; segments ovate-oblong, membranous.
 - Fronds suberect; segments linear, herbaceous.
 - ††Veins 1 to 4 times forked.
 - Segments 2-8 mm. broad, dilatate or surcurrent, joined; sori round.
 - Rachis paleaceous beneath; veins once forked; sori supramedial.
 - Rachis devoid of scales; veins mostly twice forked; sori medial.
 - Segments 8-22 mm. broad, adnate, distinct; sori oval or elliptical.
- B. Veins anastomosing, the areoles in 1 to several rows.
- a. Areoles uniform, each with a single free, included venule, the sori terminal upon the latter.
 - *Blades simple and entire.
 - **Blades pinnatisect.
 - Fronds freely paleaceous beneath.
 - Blades 4-15 cm. long; segments few, rounded at apex; sori supramedial, immersed.
 - Blades 15-45 cm. long; segments numerous, acute; sori infremedial, impressed.
 - Fronds nearly or quite devoid of scales.
 - Rhizomes sinuous, 2-5 mm. thick, the scales few, appressed; blades glabrous.
 - Rhizomes cylindrical, 8-14 mm. thick, the scales tufted; blades strongly pubescent.
 - b. Areoles not uniform, the costal ones (no. 18 excepted) without an included venule, some of the others with 1 to several, free or anastomosing venules; sori various in position.
 - *Blades of a linear type, simple and entire.
 - †Venation subequal; strong lateral veins not developed.
 - Costal areoles mostly with an included venule; rhizomes short-creeping.
 - Costal areoles without included venules; rhizomes wide-creeping.
 - Blades lepidote; sori elliptical to linear.
 - Blades naked; sori round.
 - Rhizomes filiform; paracostal areoles narrow, oblique.
 - Rhizomes funiform; paracostal areoles broad, divergent.
 - ††Venation very unequal; numerous oblique or divergent, elevated lateral veins excurrent nearly to the margin.
 - Included venules excurrent, parallel, simple, the sori terminal upon them in 2-4 rows between the main veins.
 - Fronds nearly or quite exstipitate; blades usually plane, acuminate or attenuate at apex.
 - Fronds stipitate; blades repand, often corrugate, acute or acutish at apex.

1. *P. Hessii*.
2. *P. duale*.
3. *P. myosuroides*.
4. *P. trifurcatum*.
5. *P. taenifolium*.
6. *P. asplenifolium*.
7. *P. jubaeforme*.
8. *P. mollissimum*.
9. *P. tarifolium*.
10. *P. Plumula*.
11. *P. pectinatum*.
12. *P. dissimile*.
13. *P. piloselloides*.
14. *P. polypodioides*.
15. *P. squamatum*.
16. *P. loriceum*.
17. *P. chnoodes*.
18. *P. angustifolium*.
19. *P. astrolepis*.
20. *P. heterophyllum*.
21. *P. lycopodioides*.
22. *P. phyllitidis*.
23. *P. latum*.
24. *P. crassifolium*.

**Blades broad, deeply pinnatifid.

Stipes wiry, dull brown; segments 5–8 mm. broad, the costa concealed.

25. *P. sectifrons*.

Stipes stout, glossy brown; segments 1.5–7 cm. broad, the costa elevated.

Sori in 1 or 2 (rarely 3) rows at either side of the costa, the primary veins flexuous or irregular and discontinuous.

26. *P. aureum*.

Sori in 4–7 rows at either side of the costa, the primary veins prominent, straight, parallel.

27. *P. decumanum*.

1. *Polypodium Hessii* Maxon, Bull. Torrey Club **42**: 223. 1915.

Rhizome decumbent, 1–1.5 cm. long, 2–3 mm. thick, obscurely paleaceous; scales dark reddish-brown, acicular, 2–4 mm. long. Fronds few, subfasciculate, ascending, 8–14 cm. long, the short stipe alate, at first pubescent with branched glandular hairs; blades firmly membrano-chartaceous, linear and entire, 7–13 cm. long, 5–9 mm. broad, narrowly attenuate in the basal third, more abruptly so toward the apex, the tips subcaudate; margins delicately repand, with a filiform border of lustrous blackish-brown sclerotic tissue; veins free, oblique, concealed, the sterile ones simple; sori oval, borne in the apical half, seated partially or wholly upon a very short, translucent spur of the veins far below their middle, thus close to the costa, separate or at length subconfluent.

Mossy trunks of forest trees, Porto Rico, at middle and higher elevations. Endemic.

2. *Polypodium duale* Maxon, Contr. U. S. Nat. Herb. **16**: 61. 1912.

Acrostichum serrulatum Sw. Prodr. 128. 1788.

Xiphopteris serrulata Kaulf. Enum. Fil. 85. 1824.

Micropteris serrulata Desv. Mém. Soc. Linn. Paris **6**: 217. 1827.

Polypodium serrulatum Mett. Fil. Hort. Lips. **30**. 1856. Not Sw. 1801.

Xiphopteris extensa Fée, Mém. Foug. **11**: 14. 1866. Not *Polypodium extensum* Forst. 1786, Presl, 1825, nor Fée, 1869.

Plants gregarious. Rhizomes filiform, 2–5 cm. long, 0.2–0.5 mm. thick, ascending; scales laxly appressed-imbricate, lanceolate, 3–4 mm. long, entire, fulvous to brown, deciduous. Fronds numerous, imbricate-ascending, 2–10 cm. long, short-stipitate, subdimorphous, the sterile ones short, the linear blades 1–3 mm. broad, deeply serrate or serrately incised nearly to the concealed rachis, the lobes acute, long-decurrent, costate; fertile fronds much longer, the blades 0.5–1.5 mm. broad in the lower sterile half, distantly low-serrate to obsoletely serrulate, the fertile apical portion (1–5 cm.) often deeply falcate, lightly sinuate, 1–2 mm. broad, flat or at maturity conduplicate, densely fertile, the sori solitary at the base of the close, decurrent, simple veins, elliptical, soon confluent and concealing the costa and lower surface in a single heavy line. Leaf-tissue thick-herbaceous, bright green, translucent.

Moist banks, mossy boulders, and tree trunks, Porto Rico, at middle and higher elevations:—Jamaica; Cuba; Hispaniola; Saba; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad. Mexico to Bolivia and southern Brazil; tropical Africa.

3. *Polypodium myosuroides* Sw. Prodr. 131. 1788.

Grammitis myosuroides Sw. Journ. Bot. Schrad. **1800**²: 18. 1801. Not Schkuhr, 1804.

Polypodium Jamesoni Jenman, Bull. Bot. Dept. Jamaica II. **4**: 112. 1897.

Not *Xiphopteris Jamesoni* Hook. 1860, nor *Polypodium Jamesoni* Mett. 1883.

Rhizome erect, about 2 mm. thick, densely imbricate-paleaceous; scales linear, hair-pointed, 2–3 mm. long, dark brown, clathrate, entire. Fronds numerous, imbricate-cespitose, rigidly ascending, 3.5–8 cm. long, the stipe very short, dark, distantly stellate-setulose; blades narrowly linear, 3–6 cm. long, 1.5–3 mm. broad, the apical third or half crenulate to serrate-crenate, fertile,

the lower part deeply pinnatifid, the segments remote, oblong, rounded at apex, decurrent and lightly joined, the lowermost long-decurrent and vestigial; rachis concealed above, blackish beneath, deciduously setulose; veins simple, oblique, solitary in the sterile segments, dark and closely parallel in the caudate fertile tip; sori nearly basal, oval, slightly depressed, soon widely confluent and covering the rachis. Leaf-tissue bright green, rigidly herbaceous, at first minutely setulose.

Tree trunks in wet forest, Rio de Maricao, Porto Rico, at 500–600 meters elevation (E. G. Britton 2670a):—Known otherwise only from Jamaica, there ascending to 2,220 meters.

4. ***Polypodium trifurcatum*** L. Sp. Pl. 1084. 1753.

Polypodium comptoniaefolium Desv. Ges. Naturf. Freund. Berlin Mag. 5: 316. 1811.

Polypodium comptonioides Desv. Mém. Soc. Linn. Paris 6: 231. 1827.

Polypodium scolopendroides Hook. & Grev. Icon. Fil. 1: pl. 42. 1828. Not L. 1753.

Polypodium trifurcatum brevipes Hieron. Bot. Jahrb. Engler 34: 500. 1905.

Rhizome short-creeping, 2–4 cm. long, 4–6 mm. thick, the exposed apex densely paleaceous; scales tufted, golden brown, lance-attenuate or broader, about 5 mm. long, lax, reticulate, denticulate-ciliolate. Fronds ascending, 15–35 cm. long, decurved at the base of the blade, the stipe 5–10 cm. long, slender, castaneous, lustrous, castaneous-pilose; blades linear-lanceolate to ligulate, 10–25 cm. long, 1.5–4 cm. broad, short-cuneate at base, subentire at the acute or acutish apex, elsewhere obliquely lobed one-third or half-way to the slender concealed costa, the lobes semicircular to deltoid and acutish, 6–12 mm. broad at the acutish sinuses, entire, bearing a few marginal setae; veins very oblique, flexuose, pinnately branched within the lobes, the basal branches variously joined or not; sori elliptical, superficial, terminal or subterminal on short distal secondary branches, distant, arranged in a single row at either side of the main veins. Leaf-tissue bright green, loosely spongy, the sori depressed in drying.

Tree trunks and mossy rocks in wet forest, Porto Rico, at middle and higher elevations:—Jamaica; Hispaniola; Guadeloupe; Dominica; Martinique; St. Vincent; Grenada. Guatemala to British Guiana and Bolivia.

5. ***Polypodium taenifolium*** Jenman, Bull. Bot. Dept. Jamaica II. 4: 114. 1898.

Polypodium Sintenisii Hieron. Hedwigia 44: 101. 1905.

Rhizome erect or curved-ascending, 1–2 cm. long, slender; scales numerous, bright brown, lustrous, lanceolate, 1.5–2.5 mm. long, rigidly setose-ciliate. Fronds numerous, imbricate-cespitose, rigidly ascending, 10–25 cm. long, the stipe very short, densely clothed with spreading castaneous hairs; blades narrowly linear, 5–9 mm. broad at middle, narrowly attenuate both ways, crenately lobed at the short subcaudate apex, subpinnatisect elsewhere, the lower segments minute, abruptly discontinuous; rachis slender, blackish, setose; segments 50–100 pairs, alternate, close, horizontal, oblong, rounded at apex, slightly joined at base, subcoriaceous, entire, equilateral, or (if fertile) sometimes gibbous above, 1–2 mm. broad, the margins and both surfaces obliquely castaneous-setose; veins solitary, simple in the sterile segments, with a short soriferous distal branch in the fertile ones; sori subterminal, solitary, 1–1.5 mm. broad, touching the rachis at maturity.

Epiphytic, in wet mountain forests, Porto Rico, at higher elevations:—Jamaica; Hispaniola; Guadeloupe; Montserrat; Martinique; Grenada; Trinidad.

The Porto Rican plants were first listed by Urban as *P. trichomanoides* Sw., a species apparently restricted to Jamaica and Guatemala.

6. ***Polypodium asplenifolium*** L. Sp. Pl. 1084. 1753.

? *Polypodium suspensum* L. Sp. Pl. 1084. 1753.

Polypodium laxifrons Liebm. Dansk. Vid. Selsk. Skrift. V. 1: 204. 1849.

Rhizome short-creeping, 2–4 mm. thick, brittle, densely paleaceous; scales loosely tufted, yellowish-brown, lustrous, ligulate from a slightly broader base, obtuse, 2–4 mm. long, rigidly castaneous-setose. Fronds several, adjacent, 20–65 cm. long, the stipes usually shorter than the blades, firm, brown or atropurpureous, freely castaneous-pilose, mostly decurved at apex; blades drooping, linear, 15–45 cm. long, 2–5 cm. broad, acuminate at apex, truncate or abruptly acute at base, pinnatisect throughout, the blackish rachis clothed with long castaneous hairs, these extending to the costae, margins, and upper surface of the segments; segments alternate, close, horizontal, narrowly deltoid-oblong, acute to rounded-acute, 1–2.5 cm. long, 5–10 mm. broad at the adnate, slightly decurrent or subdilatate base, entire, the costa flexuous, blackish, sometimes evident beneath; veins oblique-spreading, 9–12 pairs, the sterile ones straight, simple, the fertile ones gibbous at the rudimentary medial spur, this bearing the sorus; sporangia freely setulose. Leaf-tissue thin-herbaceous, bright to dull green, glutinous-glandular beneath.

Trunks of trees and tree ferns, in forests, at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Montserrat; Martinique; St. Vincent; Grenada; Trinidad. Mexico to Venezuela.

The sole basis of *P. asplenifolium* L. is Petiver's plate 7, figure 16, representing a Martinique plant figured by Plumier (*pl. 102, a*). These illustrations agree with Lesser Antilles material usually so named and with Porto Rican specimens listed by Urban as *P. suspensum* L. and *P. laxifrons* Liebm. *P. suspensum* was founded wholly upon Plumier's plate 87, right hand figure, representing a Martinique plant of very doubtful identification. The Jamaican plant described by Jenman as *P. suspensum* is a form of *P. asplenifolium* L. with close, acute segments; the Jamaican plant which he called *P. asplenifolium* is apparently an undescribed species, which, though closely simulating broad forms of *P. asplenifolium*, differs notably in its sparsely long-setose (not freely setulose) sporangia. The Mexican and Central American *P. laxifrons* Liebm. is clearly *P. asplenifolium* L.

7. *Polypodium jubaeforme* Kaulf. *Flora* 6: 364. 1823.

Polypodium saccatum Fée, *Gen. Fil.* 239. 1852.

Rhizome erect, slender, 1–2 cm. long; scales numerous, light brown, oblong-lanceolate to cordate-ovate, 2–3 mm. long, entire, clathrate. Fronds many, recurved-spreading, 10–30 cm. long, nearly exstipitate; blades linear, 6–16 mm. broad, attenuate at base and apex, pinnatisect, the rachis black, elevated, glabrate; segments numerous, firmly herbaceous, alternate, close, adnate, slightly oblique, oblong or triangular-oblong, 4–10 mm. long, 1.5–4 mm. broad at the decurrent base, obtuse or acute, entire, the lower ones broader and long-decurrent; costae concealed; veins simple, oblique, ending in reddish linear hydathodes; sori 2–8 pairs, small, deeply impressed, usually contiguous at maturity and thrust against the recurved margin.

On trees, at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Dominica; Martinique; St. Vincent; Grenada; Trinidad. Northern South America. Ascribed also to Panama.

8. *Polypodium mollissimum* Fée, *Mém. Foug.* 11: 47. *pl. 12, f. 2*. 1866.

Rhizome erect, 3–8 mm. long, 2–3 mm. thick, non-paleaceous, densely rusty-pilose. Fronds several or numerous, closely cespitose, pendent, 10–45 cm. long, the short blackish stipe (0.5–2 cm.) densely rusty-pilose at base, the hairs spreading or retrorse, fewer and paler upward; blades pinnatisect throughout, narrowly linear, 0.7–2.5 cm. broad, acute at apex, attenuate at base, the lower segments (several pairs) gradually reduced, broadly triangular-dilatate, short, the lowermost minute and winglike; rachis slender, blackish, elevated beneath, rusty-pilose; segments close, alternate, horizontal, mostly ovate-oblong, roundish at apex, adnate and sometimes decurrent, or decurved above and below, entire or lightly crenate-undulate, membranous, translucent, laxly hirsute above, glutinous-glandular and closely hirtellous beneath, the margins castaneous-setose; costae concealed, flexuous; veins 3–6 pairs, simple, short, spreading; sori 1–4 pairs, terminal, borne mostly in the apical half of the segment; sporangia whitish-setose.

Depending from tree trunks, wet mountain forests, at middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Martinique. Guatemala to Panama.

Listed by Urban as *P. asplenifolium* L., but more often confused with *P. cultratum* Willd., which differs in its horizontal, distinctly scaly rhizome, evident costae, hirsute under surface, and long-setose sporangia.

9. *Polypodium taxifolium* L. Sp. Pl. 1086. 1753.

Rhizome short-creeping, 1–2 cm. long, 2–3 mm. thick, closely nodose, obscurely paleaceous; scales bright brown, rigid, deltoid-lanceolate, finely hair-pointed, entire, non-ciliate, 1.5–2.5 mm. long. Fronds several, closely distichous, suberect, 12–35 cm. long, the stipes 2–5 cm. long, dull brown, rusty-hispid; blades pinnatisect, linear to oblanceolate-linear, 10–30 cm. long, 2–3 cm. broad near the middle, tapering both ways, acute or acuminate at apex, usually subtruncate at base, the small lowermost segments subdistant; rachis sparsely castaneous-setose beneath, densely so above; segments alternate, horizontal, linear, 1–1.5 cm. long, 2–3 mm. broad, roundish at apex, fully adnate, close, with narrow rounded sinuses, thin-herbaceous, translucent, glabrous above, sparsely castaneous-setulose beneath and along the subrevolute entire margins; costae fuscous, flexuous, evident; veins 6–10 pairs, simple, short, spreading, distant; sori small, terminal, nearly equidistant from the costa and margin.

Wet rocks and trunks of forest trees, at higher elevations, Porto Rico:—Martinique; Guadeloupe; Grenada. Costa Rica.

This is presumably the species listed from Porto Rico by Urban as *P. Trichomanes* St. Hil., but the two specimens cited have not been seen. The high-mountain Jamaican plant described by Jenman as *P. taxifolium* is *P. semihirsutum* Klotzsch (*P. leucolepis* Gilbert), a species of wide distribution on the Continent.

10. *Polypodium Plumula* Humb. & Bonpl.; Willd. Sp. Pl. 5: 178. 1810.

Polypodium elasticum L. Rich. Act. Soc. Hist. Nat. Paris 1: 114. 1792 (nomen nudum). Not Bory. 1810.

Rhizome woody, short-creeping, 4–10 mm. thick, densely paleaceous; scales dark brown, 2–4 mm. long, linear-deltoid, attenuate, denticulate. Fronds several, subfasciculate, ascending or recurved-spreading, 15–60 cm. long, the stipes short, dull fuscous to ebeneous, laxly puberulous, deciduously appressed-paleaceous; blades subpinnatisect, linear to linear-oblong, 12–45 cm. long, 3–8 cm. broad, acutish at apex (the tip often caudate), abruptly acutish or subtruncate at base, the rachis dark brown or ebeneous, crispate-pubescent above with grayish septate hairs, scantily glandular-pubescent beneath and bearing a few small, spreading, deltoid-ovate, long-attenuate, brownish scales; segments numerous, close, horizontal, alternate, ligulate from a subdilatate short-surcurrent base, 1.5–4 cm. long, 2–5 mm. broad at middle, rounded-obtuse or acutish at apex, elastic-herbaceous, opaque, the margins entire, cartilaginous, ciliolate; costae ebeneous, elevated beneath, together with the leaf surfaces septate-puberulous; veins numerous, obscure, oblique, once-forked; sori yellowish-brown, close, nearer the margin than the costa, terminal upon the distal branches.

Occurring sparingly on logs, tree trunks, and moist rocky banks, at middle elevations, Porto Rico:—Jamaica; Cuba; Bermuda; Hispaniola; Trinidad. Florida; Mexico to Brazil.

Variable in several characters, especially in the scales of the blade, but here accepted in the usual sense. This is probably the species listed by Urban as *P. taxifolium*, but the three numbers cited (*Sintenis* 426c, 1328b, 2271) have not been seen.

11. *Polypodium pectinatum* L. Sp. Pl. 1085. 1753.

Rhizome woody, creeping, 4–10 mm. thick, nodose, densely paleaceous; scales dark brown, 4–6 mm. long, flexuous-acicular from a narrowly deltoid base, distantly septate-ciliate. Fronds few, subfasciculate or apart, rigidly ascending, 25–110 cm. long, the stipes short, brown to atropurpureous, firm, paleaceous at base; blades subpinnatisect, linear to lance-elliptic or oblanceolate, 20–90 cm. long, 5–13 cm. broad at middle, tapering at apex and base, the rachis stout,

brown, whitish-puberulous, non-paleaceous; segments numerous, alternate, horizontal, mostly linear-ligulate from a dilatate, nearly equilateral base, 2.5–7 cm. long, 4–8 mm. broad at middle, acutish or rounded-obtuse at apex, entire, thin-herbaceous, the lower ones rather abruptly reduced, finally evident only as low decurrent wings; costae slender, elevated beneath, together with the lower leaf surface finely whitish-puberulous, scantily so above; veins immersed, oblique, once or twice forked, free or the outer branches casually joined; sori medial, subdistant, terminal upon the first distal branches.

On rocks, logs, and tree trunks, in thinly shaded situations at lower to higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada. Florida; Mexico to South America. Here regarded in the conventional sense, as consisting of several variable forms.

12. *Polypodium dissimile* L. Syst. Nat. ed. 10, 2: 1325. 1759.

Polypodium sororium Humb. & Bonpl.; Willd. Sp. Pl. 5: 191. 1810.

Rhizome carnose, creeping, 10–20 cm. long, 5–8 mm. thick, densely paleaceous; scales laxly imbricate, ferruginous, ovate-attenuate, 4–8 mm. long, thin, subentire. Fronds few, subdistant, ascending, 30–95 cm. long, the stipes shorter than the blades, olivaceous to light castaneous, glabrescent, paleaceous at base; blades linear-oblong to deltoid-oblong, 25–65 cm. long, 7–25 cm. broad, pinnate at the truncate base and above, pinnatisect upward to the evenly acuminate, pinnatifid apex, the tip often caudate (2–8 cm.), attenuate, and subentire; rachis stout, densely septate-hirtellous above, glabrate beneath; pinnae oblique-spreading, narrowly oblong to ligulate, 4–16 cm. long, 8–22 mm. broad, acuminate at apex, often constricted at one or both sides at base, the basal ones sometimes nearly free, distant, the middle ones adnate but apart, only the upper lightly joined; margins entire to sinuate, or crenate toward the base, distantly ciliate; costae stramineous, elevated beneath, glabrate; veins spreading, evident, dark, 2–4 times pinnately forked, the sori terminal upon the first distal branches, oval or elliptical, uniserial, slightly inframedial. Leaf-tissue membrano-papyraceous, translucent, glabrate.

Logs, tree trunks, and earth banks of moist forested slopes, Porto Rico, at middle and higher elevations:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Martinique; St. Vincent; Grenada; Trinidad. Mexico to northern South America.

13. *Polypodium piloselloides* L. Sp. Pl. 1083. 1753.

Marginaria piloselloides Presl, Tent. Pter. 187. 1836.

Goniophlebium piloselloides J. Smith; Hook. Gen. Fil. pl. 51. 1840.

Craspedaria piloselloides Fée, Gen. Fil. 264. 1852.

Lopholepis piloselloides J. Smith in Seem. Bot. Voy. Herald 229. 1854.

Lepicystis piloselloides Diels in Engl. & Prantl, Pflanzenfam. 14: 323. 1899.

Rhizomes wide-creeping, interlacing, filiform, 0.5–1 mm. thick: scales appressed-imbricate, thin, light ferruginous, lance-linear, attenuate, falcate, 3–4 mm. long. Fronds distant, erect, subdimorphous, the sterile ones numerous, mostly 3–7 cm. long, paleaceous throughout, the blades usually 2 or 3 times as long as the slender stipes, pointed-elliptic to ovate or ovate-oblong, 2–5 cm. long, 1–2 cm. broad, simple, entire, cuneate at base, chartaceo-herbaceous, opaque; scales small, thin, appressed, ovate-acuminate, peltate, mostly distant, those of the upper side minute and deciduous: venation goniophleboid, a single row of large prominulous areoles at either side of the costa, the short outer veinlets mostly free and parallel. Fertile fronds 4–10 cm. long, the blades lance-linear, 4–10 mm. broad, narrowly cuneate at base, acutish or obtuse at apex; sori very large, the sporangia with numerous acicular scales intermixed.

On stone walls, mossy boulders, and tree trunks, at lower and middle elevations Porto Rico; St. Thomas:—Jamaica; Cuba; Hispaniola; Saba; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada. Also, eastern Guatemala.

14. **Polypodium polypodioides** (L.) Watt, *Canad. Nat.* II. 13: 158. 1867.

Acrostichum polypodioides L. Sp. Pl. 1068. 1753.

Acrostichum ferruginosum L. Sp. Pl. ed. 2, 1525. 1763.

Polypodium incanum Sw. Prodr. 131. 1788.

Polypodium ceteracinum Michx. Fl. Bor. Amer. 2: 271. 1803.

Polypodium velatum Schkuhr, Krypt. Gewächse. 1: 188. pl. 11, b. 1809.

Lepicystis incana J. Smith, Lond. Journ. Bot. 1: 195. 1842.

Marginaria polypodioides Tidestrom, *Torreya* 5: 171. 1905.

Rhizomes wide-creeping, 1–2 mm. thick, flexuous, densely appressed-paleaceous; scales widely imbricate, 3–4 mm. long, lance-subulate, castaneous, with paler denticulate-ciliolate borders. Fronds distant, erect, 5–25 cm. long, the stipes usually shorter than the blades, firm, closely peltate-paleaceous; blades linear-oblong to narrowly deltoid-oblong, 4–15 cm. long, 1.5–6 cm. broad, acutish at apex, truncate at base, pinnatisect, strongly paleaceous beneath throughout, the scales roundish to deltoid-ovate and acuminate, peltate, adjacent to widely appressed-imbricate, castaneous, with paler erose-denticulate borders; scales of the upper side few, distant, slender, pale, deeply fimbriate; segments few, distant, linear or linear-oblong, 2.5–5 mm. broad, rounded at apex, broadly dilatate at base, the sinuses broad, rounded; venation concealed, goniophleboid, or the areoles imperfectly uniserial; sori supramedial, distant, protruding from deep pockets, the upper leaf surface strongly embossed. Leaf-tissue thick, opaque, the segments and blades involute in drying, hygroscopic.

On rocks and tree trunks, in open or partially shaded situations, at middle elevations, Porto Rico; St. Thomas;—Jamaica; Cuba; Bahamas; Hispaniola; Saba; St. Eustatius; St. Kitts; Antigua; Guadeloupe; Dominica; Montserrat; Martinique; Barbados; St. Vincent; Grenada; Trinidad; Tobago. Southeastern United States to Argentina; also South Africa.

15. **Polypodium squamatum** L. Sp. Pl. 1086. 1753.

Marginaria squamata Presl, Tent. Pter. 188. 1836.

Goniophlebium squamatum Moore, Ind. Fil. 391. 1862.

Drynaria squamata Fée, Mém. Foug. 11: 72. 1866.

Pleopeltis squamata J. Smith, Hist. Fil. 114. 1875.

Rhizome wide-creeping, about 5 mm. thick, branched, flexuous, densely paleaceous; scales loosely imbricate, 3–4 mm. long, broadly ovate in the basal third, acuminate-attenuate, castaneous, with a narrow pale lacerate-fimbriate border. Fronds adjacent, suberect or spreading, 20–65 cm. long, the stipes shorter than the blades, paleaceous; blades pinnatisect, lance-linear to linear-oblong, 15–45 cm. long, 3–12 cm. broad, acutish and often abruptly caudate at apex, acutish at base or subtruncate, with 1–4 pairs of greatly reduced, distant segments, the rachis strongly paleaceous; segments numerous, nearly horizontal, linear-ligulate, acutish, 3–7 mm. broad at middle, lightly joined at the dilatate base (the sinuses roundish), imbricate-paleaceous (densely so beneath), the scales acicular-filiform from a short, ovate-acuminate, castaneous, pale-fimbriate base; venation goniophleboid, the areoles uniserial; sori slightly inframedial, distant, impressed. Leaf-tissue spongiouse-coriaceous, rigid and corrugate in drying.

On rocky banks and tree trunks in open situations, at middle and higher elevations, Porto Rico;—Jamaica; Cuba; Hispaniola; Bahamas.

16. **Polypodium loricum** L. Sp. Pl. 1086. 1753.

Goniophlebium loricum J. Smith; Hook. Gen. Fil. under pl. 51. 1840.

Goniophlebium pectinatum J. Smith in Seem. Bot. Voy. Herald 230. 1854.

Not *Polypodium pectinatum* L. 1753.

Rhizomes wide-creeping, firm, sinuous, plumbeous, often white-ceraceous, 2–5 mm. thick, sparsely rooting at intervals, appressed-paleaceous, the scales brown, clathrate, ovate-oblong and imbricate to roundish and distant, peltate.

Fronds few, distant, spreading, 30–90 cm. long, the stipes shorter than the blades, olivaceous to light brown, glabrous; blades linear-oblong to ovate-oblong, 20–60 cm. long, 7–25 cm. broad, subpinnatisect throughout, rather abruptly acuminate-caudate at apex, the rachis distantly appressed-paleaceous beneath; segments alternate or subopposite, ligulate, acuminate or attenuate at apex, entire or lightly sinuate, 4–13 cm. long, 7–15 mm. broad, adnate, all but the upper ones surcurrent, lightly joined (the sinuses upcurved), mostly horizontal and falcate, the lower ones often deflexed, subdistant, slightly reduced; venation goniophleboid, usually prominulous, the areoles in 1 or 2 series at either side of the elevated costa; sori yellowish-brown, subdistant, evenly 1 or 2-seriate. Leaf-tissue dull green, chartaceo-herbaceous, glabrous.

Moist forested slopes, at middle and higher elevations, Porto Rico, clambering on tree trunks and rocky banks:—Jamaica; Cuba; Hispaniola; Saba; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad; Tobago. Mexico to Brazil and Bolivia.

17. ***Polypodium chnoodes*** Spreng. Neu. Entd. 3: 6. 1822.

Marginaria chnoodes Presl, Tent. Pter. 189. 1836.

Goniophlebium chnoodes Fée, Gen. Fil. 255. 1852.

Rhizome creeping, cylindrical, carnose, 8–14 mm. thick, densely paleaceous; scales tufted, blackish or dark brown and iridescent in mass, strongly reticulate-clathrate, acicular or filiform from a deltoid-ovate base, 5–10 mm. long. Fronds few, subdistant, laxly arching, 0.3–1.2 m. long, the stipes much shorter than the blades, slender, stramineous, puberulous; blades linear-oblong, 20–90 cm. long, 10–25 cm. broad, acute at apex, truncate at base, pinnatisect nearly throughout, only the evenly reduced upper segments lightly joined; rachis slender, pale, puberulous; pinnae opposite, subdistant, ligulate, 6–14 cm. long, 1–2 cm. broad, long-acuminate, mostly horizontal and falcate, the lower ones deflexed and recurved, adnate at upper base, cordate-clasping below, the middle ones mostly adnate, the upper slightly surcurrent, all the pinnae entire or lightly repand-sinuate, puberulous above, laxly white-hirtellous beneath, the costae slender, stramineous, elevated; venation goniophleboid, the areoles short, broad, 2–4-seriate at either side; sori 2–4-seriate, small. Leaf-tissue dull grayish-green, herbaceous in drying.

On logs and trunks of forest trees, rarely on shady banks, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Martinique; St. Vincent; Grenada; Trinidad. Guatemala to Colombia.

18. ***Polypodium angustifolium*** Sw. Prodr. 130. 1788.

Polypodium ensifolium Willd. Sp. Pl. 5: 152. 1810.

Polypodium taeniosum Willd. op. cit. 155.

Campyloneurum angustifolium Fée, Gen. Fil. 257. 1852.

Campyloneurum taeniosum Fée, loc. cit.

Campyloneurum ensifolium J. Smith, Cat. Cult. Ferns 12. 1857.

Rhizome short-creeping, 3–7 mm. thick, firm, nodose, usually pruinose, sometimes branched and multicipital, deciduously paleaceous; scales ascending, castaneous to dark brown, attenuate from a narrowly ovate base, clathrate-reticulate. Fronds numerous, dorsal, crowded, ascending or subpendent, 20–70 cm. long, nearly or quite exstipitate, the leaf-tissue of the blade long-decurrent as a narrow wing; blades narrowly linear, 3–15 mm. broad, evenly long-attenuate downward, less gradually so to the rigid subulate-caudiform tip, simple, usually falcate, rigidly coriaceous in drying, lustrous, paler beneath, often repand, the margins entire, revolute; costa sharply elevated beneath, yellowish; veins deeply immersed, oblique, subequal, variously joined in 1 or 2 irregular rows of areoles, these mostly with 1 or 2 included venules each; sori 1–2-seriate, subdistant, dorsal or subterminal upon the free venules.

⁷⁻²¹ Rocky banks and tree trunks, in partly open situations, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe. Florida; Mexico to Argentina.

On the continent this species is notably variable, and many forms have been described as distinct; the synonymy is extensive. The present description applies to the typical West Indian plant.

19. *Polypodium astrolepis* Liebm. Dansk. Vid. Selsk. Skrift. V. 1: 185. 1849.

Grammitis elongata Sw. Syn. Fil. 22, 213. 1806. Not *Polypodium elongatum* Ait. 1789, nor Schrad. 1818.

Grammitis lanceolata Schkuhr, Krypt. Gewächse. 1: 9. pl. 7. 1806. Not *Polypodium lanceolatum* L. 1753.

Grammitis squamulosa Splitg. Tijds. Nat. Gesch. 7: 398. 1840. Not *Polypodium squamulosum* Kaulf. 1824.

Drynaria Prieurii Fée, Gen. Fil. 271. 1852.

Polypodium elongatum Mett. Abh. Senckenb. Ges. Frankfurt 2: 88. 1857.

Gymnogramme elongata Hook. Sp. Fil. 5: 157. 1864.

Taenitis Swartzii Jenman, Journ. Bot. Brit. & For. 17: 263. 1879.

Rhizome cordlike, wide-creeping, branched, 0.5–1 mm. thick, black; scales blackish, appressed, roundish, peltate, minute, mostly concealed by short trichomes. Fronds distant, 8–22 cm. long, the stipes 0.5–2 cm. long, dark, flattish, greenish-marginate; blades linear to lance-linear or oblanceolate, 7–18 mm. broad, usually attenuate both ways, decurrent, obtuse to long-acuminate at apex, simple, entire, chartaceous to rigidly coriaceous, hygroscopic, repand, the rachis evident beneath to the middle or beyond, blackish; leaf surface sparsely lepidote, persistently so beneath, the scales minute, lacerate-stellate; venation immersed, phlebotiod, the costal areoles narrow, the paracostal ones larger, oblique, compound, or with 2 to several oblique, simple or branched venules, their tips joined by a transverse, elongate common receptacle; sori elliptical to linear (2–10 mm. long), or subcontinuous, lightly impressed, nearly medial, deciduously lepidote.

Rocks and tree trunks, at lower to higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Dominica; Martinique; St. Vincent; Grenada; Trinidad; Tobago. Mexico to Brazil.

20. *Polypodium heterophyllum* L. Sp. Pl. 1083. 1753.

Polypodium serpens Sw. Prodr. 131. 1788. Not Forst. 1786.

Polypodium exiguum Hew. Mag. Nat. Hist. II. 2: 458. 1838. Not Griseb. 1864, nor Fée, 1869.

Craspedaria Plumieri Fée, Mém. Foug. 11: 71. 1866.

Polypodium Swartzii Baker in Hook. & Baker, Syn. Fil. 357. 1868.

Phymatodes exiguum Underw. Torreya 3: 18. 1903.

Rhizomes filiform, wide-creeping, 0.3–1.5 mm. thick, densely paleaceous; scales fulvous to ferruginous, subsquarrose-imbricate, linear-attenuate, 5–7 mm. long, denticulate, peltate far above the narrowed base. Fronds distant, simple, variable, the sterile ones sometimes exstipitate, oval or elliptic, 1–3 cm. long, 5–10 mm. broad, or usually 3–12 cm. long, short-stipitate (5–15 mm.), the blades linear, 10–15 mm. broad at middle, equally attenuate both ways, the margins undulate, sinuate, or sometimes irregularly crenate, rarely incised; fertile blades mostly narrower, up to 16 cm. long, undulate to broadly crenate, rarely lobate; costa percurrent, prominulous or not; veins anastomosing, the first row of areoles narrowly elongate, parallel to the costa, without included venules, the paracostal row large, oblique, mostly with a single short free included fertile venule, the excurrent branches short, free or casually joined; sori subdistant, terminal, uniseriate, medial. Leaf-tissue pale green, papyraceous to membrano-herbaceous, translucent, naked, glabrous.

Climbing on bushes and small saplings, occasionally on limestone rocks, at lower elevations, Porto Rico; Vieques; St. Jan; St. Croix; Virgin Gorda:—Jamaica; Cuba; Bahamas; Hispaniola; Montserrat. Also southern Florida. Reported from other West Indian islands and from South America, but most of these records pertain to lax forms of *P. lycopodioides* L.

21. *Polypodium lycopodioides* L. Sp. Pl. 1082. 1753.*Polypodium runcinatum* Desv. Mém. Soc. Linn. Paris 6: 230. 1827.*Polypodium quercizans* Fée, Mém. Foug. 11: 50. 1866.*Phymatodes prominula* Maxon, Contr. U. S. Nat. Herb. 10: 501. 1908.*Polypodium prominulum* C. Chr. Ind. Fil. Suppl. 61. 1913.

Rhizome cordlike, wide-creeping, 2–4 mm. thick, sinuous, with divergent branches, densely paleaceous; scales appressed-imbricate, linear-attenuate, hair-pointed, laxly ciliate, 6–10 mm. long, ferruginous, or darker and bicolorous with age, peltate. Fronds distant, simple, nearly or quite exstipitate, subdimorphous, 5–20 cm. long, the sterile ones linear-lanceolate to ligulate, 1–2.5 cm. broad, obtuse or acutish at apex (rarely acuminate), attenuate below to a narrowly cuneate base, the margins entire or undulate, lightly cartilaginous; fertile blades 0.5–1.5 cm. broad, pointed-elliptic to linear; costa elevated, the lateral veins spreading, prominulous or not; veins anastomosing, the costal areoles with 1 or more short pendent venules; paracostal areoles large, broad, subdivided into several exappendiculate minor areoles in sterile blades, mostly simple in the fertile, the solitary sorus terminal upon the single or geminate venules short-excurrent from the costal areole; marginal areoles forming an incomplete third row; sori uniseriate, slightly supramedial, large, subdistant, impressed. Leaf-tissue coriaceous or chartaceous, naked, glabrous.

On rocks and tree trunks in partial shade, at lower and middle elevations, Porto Rico; —Jamaica; Cuba; Hispaniola; St. Eustatius; St. Kitts; Antigua; Guadeloupe; Dominica; Montserrat; Martinique; Barbados; St. Lucia; St. Vincent; Grenada; Trinidad; Tobago. Guatemala to Brazil and Bolivia; also, tropical Africa and the East Indies.

22. *Polypodium phyllitidis* L. Sp. Pl. 1083. 1753.*Campyloneurum phyllitidis* Presl, Tent. Pter. 190. pl. 7, f. 18–20. 1836.

Rhizome creeping, 5–10 cm. long, 5–8 mm. thick, enveloped in a mass of brown-tomentose rootlets, paleaceous at apex; scales appressed-imbricate, light brown, broadly ovate-oblong, acutish, clathrate, subpeltate. Fronds several, erect, subfasciculate, 0.3–1.2 m. long, exstipitate, or the short stipe (1–10 cm.) narrowly alate upward, passing gradually into the long-decurrent blade; blades linear or lance-linear, tapering both ways, 4–8 cm. broad at middle, long-acuminate or attenuate at apex, simple, straight, rigidly chartaceous, yellowish-green or darker, lustrous on both sides, plane or rarely repand, the margins entire, subrevolute, cartilaginous; costa stout, elevated beneath; lateral veins oblique, elevated, straight, connected by numerous arcuate cross-veins, the areoles short, with 2 or 3 excurrent included free venules, or the intermediate venules prolonged and subcontinuously joined, an incomplete double row of minor areoles thus sometimes formed; sori numerous, golden brown, 2-seriate between the main lateral veins, superficial, subterminal or dorsal.

Common on trees, banks, and rocky slopes in open or partly shaded situations, from sea level to middle elevations, Porto Rico; Tortola; Vieques; St. Thomas; St. Jan; St. Croix; —Jamaica; Cuba; Bahamas; Hispaniola; St. Eustatius; St. Kitts; Antigua; Guadeloupe; Dominica; Montserrat; Martinique; Barbados; St. Lucia; Grenada; Tobago. Florida; Mexico to Uruguay.

23. *Polypodium latum* (Moore) Sodiro, Crypt. Vasc. Quit. 371. 1893.*Campyloneurum latum* Moore, Ind. Fil. 225. 1861.*Polypodium phyllitidis latum* Hook. Sp. Fil. 5: 38. 1863.

Rhizome short-creeping, thick, often branched, strongly nodose, the phyllopodia contiguous, 5–8 mm. broad, sharply concave; scales few, appressed, roundish-deltoid, brown, finely reticulate. Fronds several, dorsal, adjacent, erect, 0.3–1.3 m. long, glabrous throughout, the stipes stout, 5–15 cm. long, subquadrangular, sulcate-angulate, green to light brown; blades oblanceolate or pointed-elliptic to ligulate, 5–13 cm. broad, abruptly acute or acutish at apex, narrowly cuneate and short-decurrent at base, simple, straight, rigidly coriaceous,

dull green, sublustrous, repand, often transversely corrugate, the margins cartilaginous, subrevolute, entire or undulate; costa very stout, stramineous, flat or broadly sulcate above, rounded beneath; lateral veins oblique-spreading, close, elevated beneath, connected by numerous irregularly arcuate cross-veins; areoles variable, the excurrent veinlets several, variously combined to form minor areoles in 3 or 4 rows, an intermediate lateral vein sometimes developed; sori large, subdistant, borne in 2-4 rows between the main lateral veins.

On rocks and tree trunks, at lower and middle elevations, Porto Rico; St. Croix; St. Jan:—Jamaica; Cuba; Hispaniola; Guadeloupe; Martinique; Barbados; St. Vincent; Grenada; Trinidad. Florida; Mexico to Bolivia and southern Brazil.

24. ***Polypodium crassifolium*** L. Sp. Pl. 1083. 1753.

Anaxetum crassifolium Schott, Gen. Fil. pl. 1. 1834.

Phymatodes crassifolia Presl, Tent. Pter. 197. 1836.

Pleuridium crassifolium Fée, Gen. Fil. 274. 1852.

Pessopteris crassifolia Underw. & Maxon, Contr. U. S. Nat. Herb. 10: 485. 1908.

Rhizome woody, short-creeping, 5-15 mm. thick, densely paleaceous at apex, elsewhere clothed with a mass of dark brown, tomentose roots; scales imbricate, light brown, dull, ovate-acuminate, finely reticulate. Fronds few, close, erect, 0.4-1.3 m. long, the stipes short (5-15 cm.), stout, usually light castaneous, obtusely carinate beneath, broadly sulcate above, narrowly foliaceous-marginate; blades simple, linear-oblong to ligulate, 4-14 cm. broad, rounded-obtuse to abruptly acuminate-caudate at apex, attenuate at base, usually narrowly cuneate and decurrent, rigidly coriaceous or chartaceous, opaque, the margins entire, cartilaginous; costa broad, prominent; lateral veins oblique, elevated, subflexuous, 4-10 mm. apart; minor veins subequal, immersed, anastomosing, the areoles each with a simple or widely branched, included, sterile venule; sori mammiform, round or oval, 3-5 mm. broad, compital, medial and regularly uniseriate between the lateral veins, mostly confined to the upper half or two-thirds of the blade.

Rocky banks and tree trunks, in partially shaded situations at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Saba; Guadeloupe; Dominica; Montserrat; Martinique; Barbados; St. Vincent; Trinidad. Mexico to Bolivia and Brazil.

The description and synonymy relate to the common West Indian plant, which is partly replaced on the Continent by several narrow forms sometimes regarded as specifically distinct.

25. ***Polypodium sectifrons*** Kunze; Mett. Abh. Senckenb. Ges. Frankfurt 2: 99. pl. 2, f. 3, 4. 1857.

Drynaria elastica Fée, Mém. Foug. 11: 72. pl. 20, f. 2. 1866.

Polypodium petrifolium Jenman, Bull. Bot. Dept. Jamaica II. 4: 139. 1897.

Rhizome short-creeping, multicapital, conspicuously paleaceous; scales tufted, bright yellowish-brown, linear-attenuate, 6-8 mm. long, lustrous. Fronds numerous, cespitose, 25-55 cm. long, the stipes dull brown, terete, wiry, sparsely ferruginous-setose toward the base, decurved at apex; blades subpendent, oblong to deltoid-orbicular, 15-30 cm. long, 7-25 cm. broad, very deeply pinnatifid, the vascular parts wholly concealed in the thick, spongiose-coriaceous, minutely glandular leaf tissue; segments few, alternate, subequal, very oblique, narrowly linear, 5-25 cm. long, 5-8 mm. broad, slightly attenuate toward the obtuse apex, entire, joined at the decurrent bases, the double costal wing as broad as the segments, the sinuses rounded, oblique; venation immersed, anastomosing, the paracostal areoles mostly with a single fertile venule; sori few, distant, irregularly uniseriate, medial in attachment, 2-4 mm. broad, paraphysate.

On tree trunks, at middle elevations, Porto Rico; rare:—Jamaica; St. Kitts; Guadeloupe. Also Costa Rica, where it is abundant in the interior mountain region.

26. *Polypodium aureum* L. Sp. Pl. 1087. 1753.

Polypodium leucatomos Poir. in Lam. Encycl. 5: 516. 1804.

Polypodium sporadocarpum Willd. Sp. Pl. 5: 171. 1810.

Polypodium areolatum Humb. & Bonpl.; Willd. Sp. Pl. 5: 172. 1810.

Phlebodium aureum J. Smith, Journ. Bot. Hook. 4: 59. 1841.

Rhizome free-creeping, 7–15 mm. thick, thickly soft-paleaceous; scales persistent, fulvous to reddish-castaneous, linear-attenuate from a small, ovate, dark-centered base, freely denticulate-ciliate. Fronds several, subdistant, deciduous seasonally, arching or subpendent, 0.5–1.5 m. long, the stipes stout, glossy brown, shorter than the blades, paleaceous at base, glabrous; blades subdeltoid to ovate-oblong, 0.3–1 m. long, 20–50 cm. broad, deeply and coarsely pinnatifid, the rachis stout, usually glossy castaneous beneath nearly throughout; segments ligulate or linear-attenuate to lanceolate, 1.5–5 cm. broad, subequal or the upper ones gradually reduced (the terminal one usually large), mostly oblique-spreading, subentire, with open sinuses, the double costal wing 1–4 cm. broad; costal areoles small, horizontal, without included veins; sori nearly superficial, subdistant, uniseriate, solitary in the oblique paracostal areoles and terminal upon the included geminate veins, or 2-seriate (the third row of areoles similar to the paracostal), the numerous marginal areoles without included veins. Leaf-tissue papyraceous to subcoriaceous, subglaucous to pruinose on one or both sides, glabrous, the margins cartilaginous.

Rocky banks and tree trunks at lower and middle elevations, Porto Rico; Vieques; Tortola; St. Thomas; St. Jan; Virgin Gorda:—Jamaica; Cuba; Bahamas; Hispaniola; Saba; Antigua; Guadeloupe; Dominica; Montserrat; Martinique; Barbados; St. Lucia; St. Vincent; Grenada; Trinidad; Tobago; Curaçao. Also Florida; Mexico to Argentina.

27. *Polypodium decumanum* Willd. Sp. Pl. 5: 170. 1810.

Phlebodium decumanum J. Smith, Journ. Bot. Hook. 4: 59. 1841.

Chrysopteris decumana Fée, Gen. Fil. 265. 1852.

Chrysopteris dictyocallis Fée, loc. cit.

Phlebodium multiseriale Moore & Houlst. Gard. Chron. 1855: 469. 1855.

Chrysopteris multiserialis Fée, Mém. Foug. 8: 130. 1857.

Rhizome creeping, 7–15 mm. thick, densely soft-paleaceous; scales ferruginous, membranous, lustrous, linear-filiform from a slightly broader base, sharply denticulate. Fronds few, spreading, 1–2 m. long, the stipes shorter than the blades, stout (5–10 mm. thick), glossy brown, paleaceous at base, glabrous; blades broadly oblong, 0.6–1.3 m. long, 25–60 cm. broad, subpinnatisect at base, deeply pinnatifid at apex, the terminal segment broad and greatly elongate; rachis stout, elevated beneath, brown, glabrous; segments few, oblique-spreading, alternate, ligulate to narrowly oblong-lanceolate, 15–40 cm. long, 3–7 cm. broad, acuminate at apex, usually constricted above the dilatate base, the basal ones subcordate below, those above lightly joined, only the upper ones confluent, the sinuses oblique, roundish; margins cartilaginous, sinuate to repand-crenate, the sinuses minutely toothed; lateral veins prominent, oblique-spreading, nearly straight, parallel, each pair with an included double row of numerous subequal areoles, these separated by a strong continuous flexuous vein excurrent from the costal areole; sori small, multiseriate, extending to the margin, solitary, borne each upon a common receptacle terminating the 2 or 3 parallel included venules. Leaf-tissue thin-chartaceous, glabrous.

On trees at lower elevations, Porto Rico:—Hispaniola; Trinidad. Mexico to Bolivia and Paraguay.

Polypodium vexatum D. C. Eaton (*Campyloneurum cubense* Fée) was reported from Porto Rico on a Sintenis specimen (no. 6743) representing an immature state of *P. angustifolium* Sw.

13. *ADIANTUM* (Tourn.) L. Sp. Pl. 1094. 1753.

Terrestrial ferns of moist forest slopes, shady ravines, and rocky banks, the rhizomes paleaceous, thickish and suberect to slender and wide-creeping. Fronds

distichous or borne in several ranks, suberect to drooping, the stipes firm, dark, usually lustrous. Blades 1-5-pinnate or decompound (rarely simple), mostly with dark polished rachises, extremely variable in dissection according to fertility; pinnules glabrous, minutely pubescent, or distantly stellate-paleaceous, often glaucous beneath (rarely glandular-ceraceous), sessile or stalked, often articulate, deciduous in many species, membranous to coriaceous; veins free in most species. Sori appearing marginal, the sporangia borne along and sometimes between the ends of the ultimate veins, on the under side of the sharply reflexed, membranous, continuous margin or lobes of the pinnules or segments. (Greek, in allusion to the pinnules repelling rain-drops.) Species about 200, largely tropical American. Type species: *Adiantum Capillus-Veneris* L.

A. Blades simply pinnate.

1. Sporangia borne in a continuous line along both margins of the pinnae.

Veins free.

Veins anastomosing.

2. Sporangia in numerous separate, adjacent, oblong to linear sori.

Pinnae brownish green, lustrous on both sides, the sterile ones deeply and unevenly biserrate.

Pinnae dark green above, very glaucous beneath, the sterile ones evenly serrulate-denticulate.

B. Blades 2-5-pinnate.

1. Blades with an elongate terminal pinna essentially like the lateral ones.

a. Blades uniformly 2-pinnate.

*Sporangia usually borne in a continuous line.

Segments 8-15 mm. long, the fertile ones oblong; sorus usually not reaching the roundish apex of the segment.

Segments mostly 2-4 cm. long, narrowly rhombic; sorus usually extending around the acuminate or acutish tip.

**Sporangia borne in numerous adjacent sori.

Rhizome wide-creeping, cordlike, about 2 mm. thick; pinnae of an oblong type; pinnules glaucous beneath, the fertile ones up to 4.5 cm. long, 7-15 mm. broad, the sterile ones denticulate.

Rhizome creeping, nodose, 5-8 mm. thick; pinnae linear-lanceolate; pinnules not glaucous, the fertile ones 1.5-2.5 cm. long, 6-8 mm. broad, the sterile ones coarsely serrate.

- b. Blades of mature plants commonly 3-pinnate at base.

Pinnules dull green on both surfaces; sori oval to oblong, nearly straight.

Pinnules usually glaucous beneath; sori oblong-lunate to linear and deeply curved.

2. Blades decompound, lacking an elongate conform terminal pinna.

- a. Blades of a lance-oblong type; pinnae sessile, a reduced basal pinnule invariably overlying the rachis.

- b. Blades of an ovate type; pinnae stalked.

Fronds lax, usually pendent; blades 2-3-pinnate, the segments not deciduous; rhizome cord-like, with entire scales.

Fronds ascending or erect-spreading; blades 3-5-pinnate, the segments deciduous; rhizome creeping, often massive, the scales not entire. Segments subcoriaceous; rhizome scales appressed-serrate.

Segments membrano-herbaceous; rhizome scales ciliolate to fimbriate.

Scales bright yellowish-brown, ciliolate; blades lance-ovate; segments mostly ob-ovate-cuneate.

Scales dark brown, with pale, ciliate or fimbriate margins; blades deltoid-ovate, sub-pentagonal; segments larger, mostly trapeziform or rhombic-oblong.

1. *A. macrophyllum.*
2. *A. Wilsoni.*

3. *A. obliquum.*

4. *A. petiolatum.*

5. *A. pulverulentum.*

6. *A. villosum.*

7. *A. latifolium.*

8. *A. tetraphyllum.*

9. *A. cristatum.*

10. *A. melanoleucum.*

11. *A. concinnum.*

12. *A. Capillus-Veneris.*

13. *A. rigidulum.*

14. *A. fragile.*

15. *A. tenerum.*

1. *Adiantum macrophyllum* Sw. Prodr. 135. 1788.

Rhizome short-creeping, 3–8 cm. long, 4–7 mm. thick, finely brownish-paleaceous. Fronds closely distichous, erect-spreading, 30–75 cm. long, the stipes ebeneous, highly lustrous, glabrous, 15–45 cm. long; blades ovate to ovate-oblong, 15–30 cm. long, 10–20 cm. broad, simply pinnate; pinnae 3–8 pairs and a terminal one, firmly papyraceous, glabrous, subglaucous beneath, mostly opposite, the upper ones of fully fertile blades narrowly triangular from an inequilateral rectangular base, sessile, evenly acuminate, the basal 1 or 2 pairs broadly triangular from a subtruncate base, short-stalked; costae wholly wanting, the veins close, free, repeatedly dichotomous; sori continuous in a heavy line along both margins, not reaching the apex; sterile or partially fertile pinnae much broader, often irregular and shallowly incised, the basal ones deltoid-cordate or broadly subhastate, the others often rhombic or rhombic-ovate and merely acute.

Moist shady ravines, Mt. Morales, near Utuado, Porto Rico (*Britton & Marble* 825):—Jamaica; Cuba; Guadeloupe; Martinique; Tobago; Trinidad. Mexico to South America.

2. *Adiantum Wilsoni* Hook. Sp. Fil. 2: 6. pl. 72, A. 1851.

Rhizome creeping, 3–6 cm. long, 2–3 mm. thick. Fronds closely distichous, erect, 30–55 cm. long, the stipes ebeneous, glabrate, 20–40 cm. long; blades ovate, 15–20 cm. long, 8–15 cm. broad, simply pinnate; pinnae of mature fronds 3–7, distant, subcoriaceous, glabrous, lustrous, the terminal one largest, ovate to lance-ovate, acuminate, 8–12 cm. long, 2.5–6 cm. broad, the lateral ones alternate, ascending, falcate, asymmetric, oblong-lanceolate or lance-ovate, acuminate, rounded or subcordate at the inequilateral base, petiolate, the costa ebeneous and evident at base beneath, evanescent beyond; veins close, oblique, 2- or 3-forked, casually anastomosing toward the margin; sori continuous along both margins nearly to the serrate apex, the margins of sterile pinnae serrate or sharply biserrate throughout.

Very damp ravines, usually along water-courses, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola. Guatemala to Panama.

3. *Adiantum obliquum* Willd. Sp. Pl. 5: 429. 1810.

Rhizome creeping, cordlike, 2–4 mm. thick, closely invested with small, brown or yellowish-brown, acicular scales. Fronds approximate, in 2 rows, rigidly ascending, 25–70 cm. long, the stipes stoutish, polished, angulate, deciduously furfuraceous, 15–40 cm. long; blades oblong to deltoid-lanceolate, 10–30 cm. long, 7–15 cm. broad at base, mostly once-pinnate throughout; pinnae 8–13 pairs and a subhastate terminal one, brownish-green and lustrous on both sides, alternate, spreading, inequilateral, the fertile ones narrowly oblong-lanceolate or narrowly triangular, evenly attenuate to the acutish or rounded tip, rounded-rectangular at upper base, widely excavate below, mostly stalked, the basal pair sometimes deltoid, with a free proximal pinnule, or one or both of them produced into fully pinnate branches up to 8 cm. long, with 2–4 pairs of smaller secondary pinnae; sori one to each group of veinlets, borne along both margins, linear, straight or subarcuate, slightly apart; sterile pinnae broader, acute to rounded-obtuse, the margins deeply, sharply, and unevenly biserrate; costae hardly percurrent.

Wet forests and partly shaded banks along streams, chiefly at lower and middle elevations, Porto Rico:—Jamaica; Hispaniola; Guadeloupe; Martinique; Grenada; Tobago; Trinidad. Guatemala to southern Brazil.

4. *Adiantum petiolatum* Desv. Ges. Naturf. Freund. Berlin Mag. 5: 326. 1811.

Adiantum Kaulfussii Kunze, Linnaea 21: 221. 1848.

Rhizome short-creeping, 3–7 mm. thick, barbate-paleaceous. Fronds close-set in 2 or 3 rows, rigidly ascending, 25–60 cm. long, the stipes slender, black, polished, glabrous, 10–40 cm. long; blades oblong to deltoid-oblong, 15–25 cm. long, 6–12 cm. broad, simply pinnate (rarely with 1 or 2 short basal pinnate

branches); pinnae 4–12 pairs and a similar terminal one, membrano-herbaceous, glabrous, very glaucous beneath, alternate, subdistant, inequilateral, the lower ones petiolate, lance-deltoid, rounded at the upper base and often overlying the rachis, deeply excavate below; middle and upper pinnae oblong-lanceolate, long-acuminate, or the sterile ones acutish or obtuse; sori one to each group of veinlets, occupying both margins, linear, arcuate, adjacent; margins of sterile pinnae sharply and evenly serrulate-denticulate.

Moist forests, at lower to middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Martinique; Grenada; Tobago; Trinidad. Mexico to Brazil and Bolivia.

5. *Adiantum pulverulentum* L. Sp. Pl. 1096. 1753.

Adiantum monosoratum Willd. Sp. Pl. 5: 445. 1810.

Rhizome short-creeping, up to 10 cm. long, 5–9 mm. thick, obscurely pale-aceous, nodose. Fronds very closely arranged in 2 or 3 rows, usually suberect, 0.6–1.2 m. long, the stipes stout, quadrangular-sulcate, atropurpureous, polished, subpersistently furfuraceo-paleaceous, 35–60 cm. long; blades suborbicular to deltoid-oblong or (excluding the elongate terminal pinna) transversely oblong, 25–60 cm. long, 25–60 cm. broad, 2-pinnate; lateral pinnae 3–8 pairs, alternate, distant, spreading, linear to narrowly oblong-lanceolate, attenuate-caudate, 15–30 cm. long; pinnules numerous, contiguous or imbricate, bright glossy green, distantly stellate-paleaceous beneath, spreading, subsessile, dimidiate, the fertile ones narrowly oblong, 8–15 mm. long, straight or subfalcate, the tip usually rounded, upcurved, and denticulate-serrate, meeting the single linear sorus of the upper margin, or rarely rounded-truncate and bearing 1 or 2 short additional sori; sterile pinnules larger, acute, appressed-biserrate.

Low shady banks and wet forest slopes, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Martinique; Trinidad; Tobago. Continental tropical America.

6. *Adiantum villosum* L. Syst. Nat. ed. 10, 2: 1328. 1759.

Adiantum falcatum Sw. Journ. Bot. Schrad. 1800²: 82. 1801.

Adiantum lanceolatum Fée, Gen. Fil. 118. 1852.

Adiantum oblique-truncatum Fée, Mém. Foug. 11: 18. pl. 7, f. 2. 1866.

Rhizome short-creeping, strongly nodose, 5–8 mm. thick. Fronds very closely set in 2 or more rows, rigidly ascending, 0.5–1 m. long, the stipes stout, angulate, polished, deep purplish black, deciduously rusty-furfuraceous, 35–60 cm. long; blades ovate or (excluding the greatly elongate terminal pinna) transversely oblong, 25–40 cm. long, 25–50 cm. broad, 2-pinnate; lateral pinnae 2–6 pairs, mostly alternate, spreading or laxly ascending, lance-oblong to linear, up to 30 cm. long; pinnules numerous, dark green and lustrous above, usually close, spreading, short-stalked, mostly 2–4 cm. long, 7–10 mm. broad, the fertile ones strongly inequilateral, dimidiate-oblong or narrowly rhombic, the lower margin straight and parallel to the upper, the tip acuminate or abruptly acutish with a proximal auricle; sori borne along the distal side and around the apex, continuous or sometimes interrupted and arcuate; sterile pinnules larger, often imbricate, sharply biserrate.

Shaded rocky banks, at lower elevations, Porto Rico (rare); Vieques; St. Thomas; St. Croix:—Jamaica; Cuba; Hispaniola; Antigua to Tobago. Mexico to northern South America. Polymorphic.

7. *Adiantum latifolium* Lam. Encycl. 1: 43. 1783.

Adiantum denticulatum Sw. Prodr. 135. 1788. Not Burm. 1768.

Adiantum intermedium of many authors. Not Sw. Vet. Akad. Handl. 1817: 76. 1817.

Rhizome cordlike, wide-creeping, about 2 mm. thick, smooth, obliquely acicular-paleaceous, at length naked. Fronds spaced, distichous, ascending, 30–95

cm. long, the stipes atropurpureous, polished, deeply sulcate, lightly rusty-furfuraceous, 20–55 cm. long; blades deltoid to suborbicular or (excluding the conform terminal pinna) transversely oblong, 10–40 cm. long, 15–40 cm. broad, 2-pinnate; lateral pinna 1–4 pairs, alternate, spreading, narrowly oblong to ovate-oblong, acuminate, up to 20 cm. long, the rachises finely paleaceous; pinnules numerous, herbaceous, usually glaucous beneath, spreading, slightly spaced, sessile, mostly 2–4.5 cm. long, 7–15 mm. broad, inequilateral, the fertile ones obliquely oblong-lanceolate, rounded-rectangular at the upper base, widely excavate below, acute or acuminate; sori numerous, narrowly oblong, close, extending from the upper base around the apex to the excavate lower side; sterile pinnules larger, often oblong, acutish or rounded at apex, sharply denticulate.

Grassy banks and half-shaded alluvial situations, chiefly at lower and middle elevations, Porto Rico; St. Thomas, St. Croix; Peter Island;—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Montserrat; Martinique; Barbados; St. Lucia; Grenada; Trinidad. Continental tropical America. Recorded by Urban as *A. denticulatum* Sw.

8. ***Adiantum tetraphyllum*** Humb. & Bonpl.; Willd. Sp. Pl. 5: 441. 1810.

Adiantum prionophyllum H. B. K. Nov. Gen. & Sp. 1: 20. 1815.

? *Adiantum fruticosum* Poepp.; Spreng. Syst. Veg. 4: 113. 1827.

Rhizome creeping, up to 15 cm. long and 8 mm. thick, conspicuously nodose with age, closely paleaceous. Fronds closely distichous, suberect, 35–100 cm. long, the stipes atropurpureous, polished, sulcate-quadrangular, lightly rusty-furfuraceous, 20–60 cm. long; blades broadly deltoid to suborbicular in outline or (excluding the enlarged terminal pinna) transversely oblong, 15–40 cm. long, 15–40 cm. broad, uniformly 2-pinnate; lateral pinnae 2–6 pairs, mostly alternate, spreading or laxly ascending, usually linear-lanceolate, acuminate-caudate, up to 22 cm. long; pinnules numerous, dark green, glossy above, venose beneath, slightly oblique, approximate, sessile, subdimidiate, the fertile ones oblong to narrowly triangular-oblong, mostly 1.5–2.5 cm. long, 6–8 mm. broad, broadly cuneate at base, rectangular above, below cut away in a straight line two-thirds the distance to the acutish or acuminate tip; sori numerous, short, distinctly separated; sterile pinnules larger, often linear-oblong, long-acuminate, and falcate, coarsely appressed-serrate.

Moist shady ravines and rich forested slopes, at lower to higher elevations, Porto Rico;—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; Barbados; St. Vincent; Grenada; Trinidad; Tobago. Continental tropical America.

9. ***Adiantum cristatum*** L. Syst. Nat. ed. 10, 2: 1328. 1759.

Adiantum striatum Sw. Prodr. 135. 1788.

Adiantum nigrescens Fée, Gen. Fil. 117. 1852; Mém. Foug. 7: 28. pl. 11, f. 2. 1857.

Rhizome short-creeping, up to 7 mm. thick, densely clothed with tufted, acicular, pale brownish scales. Fronds distichous, usually close, suberect, 0.3–1 m. long, the stipes stout, dull atropurpureous, muricate, usually a little longer than the blade; blades lance-oblong to broadly deltoid-ovate or subpentagonal, 20–45 cm. long, 12–30 cm. broad, 2-pinnate, or 3-pinnate at base, the rachises dull, finely rusty-pubescent; pinnae 2–11 pairs and a similar or enlarged terminal one, alternate, distant, oblique, subequal, mostly linear-attenuate, the basal pair unequally bipartite, or the 2 or 3 lowermost pairs bearing 1 or 2 pairs of unequal secondary pinnae at base, these simple or the proximal lowermost one sometimes bipartite; pinnules numerous, close, dull dark green, rigidly herbaceous, striate, subdimidiate, rhombic-oblong to rhombic-ovate, mostly 7–15 mm. long, 4–7 mm. broad, broadly cuneate at base, short-stalked, the fertile ones acutish or rounded-obtuse at apex, the sterile ones subfalcate, acuminate, obscurely dentate-serrulate to subentire; sori oval to oblong, nearly straight, borne along the upper margin to or around the apex.

Moist shady banks and rocky woods, at lower and middle elevations, Porto Rico; St. Thomas;—Jamaica; Cuba; Hispaniola; Montserrat; Martinique. Ascribed, probably wrongly, to northern South America.

10. *Adiantum melanoleucum* Willd. Sp. Pl. 5: 443. 1810.

Adiantum Kunzeanum Klotzsch, Linnaea 18: 555. 1844. Not Presl, 1836.
Adiantum cubense Hook. Sp. Fil. 2: 8. pl. 73, A. 1851.

Rhizome creeping, up to 8 mm. thick, densely paleaceous. Fronds closely distichous, spreading to suberect, up to 85 cm. long, the stipes atropurpureous, delicate to stout, sulcate, scabrous, glabrous, up to 60 cm. long; blades variable, in juvenile and shade forms lance-linear, simply pinnate, 10–20 cm. long, in ordinary mature individuals deltoid-ovate or broadly subpentagonal, 20–40 cm. long, 20–35 cm. broad, 2-pinnate, or 3-pinnate at base; pinnae 2–8 pairs and a similar or enlarged terminal one, oblique, distant, mostly linear-attenuate, the basal pair often bipartite or with a single pair of spreading basal secondary pinnae; pinnules submembranous to herbaceous, dull brownish-green above, usually glaucous beneath, close, spreading, dimidiate, oblong or obliquely triangular-oblong, cuneate or rectangular at base, rounded-obtuse or truncate at apex; sori 2–4, oblong-lunate to linear and deeply curved, occupying the upper margin and apex, not reaching the projecting ends of the shallow lobes; sterile pinnules denticulate.

Limestone cliffs and rocky banks, in open or partly shaded situations, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Bahamas. Peninsular Florida. Polymorphic.

11. *Adiantum concinnum* Humb. & Bonpl.; Willd. Sp. Pl. 5: 451. 1810.

Rhizome short-creeping, up to 15 mm. thick, densely clothed with tufted, lance-acicular, entire, bright brown, concolorous scales. Fronds several, sub-fasciculate, usually drooping, 20–95 cm. long, the stipes much shorter than the blades, castaneous to atropurpureous, polished, glabrous, firmly terete with age but fragile; blades lanceolate to lance-oblong or triangular-oblong, 15–70 cm. long, 6–25 cm. broad, usually attenuate at apex, 2–3-pinnate, the rachis nearly straight, polished, weak; pinnae numerous, laxly ascending, alternate, close, mostly triangular, up to 15 cm. long, sessile by the presence of a reduced basal pinnule invariably overlying the main rachis; segments membrano-papyraceous, yellowish-green to dark green, glabrous, rhombic-obovate to broadly trapeziform, short-petiolate, not articulate, 5–15 mm. long, incise-lobate, the fertile lobes deeply emarginate, each bearing a pair of orbicular-reniform sori; sterile segments denticulate, the veinlets running to the sinuses.

Moist or dryish rocky banks, usually in partial shade, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Martinique; St. Vincent; Grenada; Trinidad. Continental tropical America.

12. *Adiantum Capillus-Veneris* L. Sp. Pl. 1096. 1753.

Rhizome creeping, cordlike, laxly paleaceous, the scales thin, light brown, lance-linear, attenuate, entire. Fronds laxly ascending or pendent, often spaced, 20–70 cm. long, the slender purplish black stipes as long as the blades or shorter, lustrous, glabrous; blades usually ovate or lance-ovate, 15–40 cm. long, 8–22 cm. broad, 2–3-pinnate at base, simpler above, the attenuate apex simply pinnate; pinnae laxly spreading, stalked, alternate; pinnules membranous to thin-herbaceous, approximate to distant, alternate, stalked, variable in size and shape, obovate to rhombic or obliquely oblong, 5–30 mm. long, narrowly to broadly cuneate, the outer edge deeply lobed or incised; sori solitary on the lobes, mostly oblong-lunate; margins of sterile pinnae denticulate, the teeth acutish to long-acuminate.

On sandstone banks at Coamo Springs, and on walls near San Juan, Porto Rico:—Jamaica; Cuba; Bermuda. Southern United States; Mexico to northern South America. Tropical and subtropical regions of the Old World.

13. *Adiantum rigidulum* Mett.; Kuhn, Linnaea 36: 76. 1869.

Rhizome probably short-creeping, the scales fuscous, lustrous, lanceolate, acuminate, lightly appressed-serrate. Fronds 25–35 cm. long, ascending, the

dark polished stipes two-thirds as long as the blades; blades ovate, 15–20 cm. long, 4-pinnate at base; segments subcoriaceous, glaucous on both sides, cuneate-oblong to rhombic-oblong or obovate, manifestly petiolate (1–3 mm.), jointed, soon deciduous, the sterile ones denticulate; sori 3–7 per segment, oval-reniform to curved-oblong, occupying the whole margin above the broadly cuneate base, borne singly or in pairs on shallow slightly retuse lobes.

St. Croix and St. Thomas. Listed from Yauco, Porto Rico (*Garber 50*) by Urban; reported also from St. Jan and Jamaica.

14. ***Adiantum fragile*** Sw. Prodr. 135. 1788.

Adiantum parvifolium Fée, Mém. Foug. 7: 27. pl. 23, f. 2. 1857.

Rhizome short, thick, often massive and multicapital, densely clothed with tufts of bright yellowish brown, lance-attenuate, ciliolate scales. Fronds numerous, tufted, obscurely distichous, rigidly ascending, 15–60 cm. long, the highly lustrous, purplish brown stipes much shorter than the blades, wiry, terete, glabrous; blades lance-ovate, 10–45 cm. long, 4–18 cm. broad, 3–4-pinnate at base; pinnae alternate, distant, rigidly erect-spreading, stalked, with distant oblique pinnules, the rachises wiry, polished; segments membrano-herbaceous, light green, distant, alternate, obovate-cuneate, 7–15 mm. long, 5–10 mm. broad, petiolulate (1–3 mm.), articulate, readily deciduous; sori subreniform to oblong, borne singly or in pairs on very shallow lobes of the rounded distal portion; sterile segments denticulate.

Rocky shores, open rocky banks, and partially shaded limestone cliffs, at lower to middle elevations, Porto Rico; Vieques; Mona Island; St. Croix; St. Jan; St. Thomas; Tortola.—Jamaica; Cuba; Hispaniola; Martinique; Guadeloupe.

15. ***Adiantum tenerum*** Sw. Prodr. 135. 1788.

Adiantum littorale Jenman, Ferns Brit. W. Ind. Guian. 96. 1899.

Rhizome short-creeping, 5–10 mm. thick, densely paleaceous, the scales imbricate-secund, deltoid-attenuate, dark brown, lustrous, with pale ciliate or fimbriate borders. Fronds few, close, distichous, erect-spreading, 25–110 cm. long, the stipes stoutish, terete, dark purplish brown, highly lustrous, glabrous, subglaucous, shorter than the blades; blades deltoid-ovate, subpentagonal, 15–70 cm. long, 15–60 cm. broad, 3–5-pinnate at base, the rachis flexuous; pinnae alternate, slightly oblique, stalked, the basal ones largest, deltoid, somewhat basiscopic, all the rachises wiry, polished; segments chartaceous, glaucous-green, alternate, mostly approximate, dimidiate, trapeziform or rhombic-oblong (the terminal ones flabellate-cuneate), stalked (2–4 mm.), articulate, deciduous, the fertile ones mostly 1–2 cm. long and broad, regularly and shallowly incised, a pair of retuse-oblong sori borne on each of the lightly bifid lobes; sterile segments often larger, deeply lobed or laciniately cleft, the margins lightly to sharply dentate.

Shady limestone hillsides and moist rocky banks, at lower to higher elevations, Porto Rico; St. Jan; St. Thomas; St. Croix.—Jamaica; Cuba; Bahamas; Hispaniola; Antigua; Saba; St. Kitts; Guadeloupe; Montserrat; Martinique; Barbados; Grenada; Tobago; Trinidad. Southern United States; Mexico to northern South America.

Adiantum Farleyense Moore, a well known horticultural form with luxuriant, nearly sterile fronds, is cultivated on St. Croix. It is believed to have arisen as a natural sport from Barbados plants of *A. tenerum* Sw.

Adiantum serrato-dentatum Willd. is listed from Porto Rico by Urban (as *A. obtusum* Desv.) on the basis of *Heller 393*, determined by Christ; this specimen, lent from Berlin, proves to be *A. cristatum* L.

14. **DORYOPTERIS** J. Smith, Journ. Bot. Hook. **3**: 404. 1841; **4**: 162. 1841.

Small terrestrial ferns of upright habit. Rhizome erect or decumbent, paleaceous, the scales sclerotic medially. Fronds fasciculate, rigidly erect, the stipes elongate, firm, ebeneous, lustrous. Blades small, coriaceous, often dimorphous, deeply cordate or hastate and entire, or deltoid-pentagonal and palmately lobed or pinnatisect, the lobes or adnate segments often coarsely and asymmetrically lobed or pinnatifid; venation immersed, free or polygonal-areolate without included veinlets. Sori terminal, paraphysate, confluent in a narrow marginal line. Indusia linear, continuous, formed of the modified, closely reflexed leaf-margin. (Greek, in allusion to the halberd-shaped blades of several species.) About 45 species, largely tropical American. Type species: *Pteris sagittifolia* Raddi.

1. **Doryopteris pedata** (L.) Fée, Gen. Fil. 133. 1852.

Pteris pedata L. Sp. Pl. 1075. 1753.

Litobrochia pedata Presl, Tent. Pter. 149. 1836.

Rhizome curved-decumbent, 2–3 cm. long, 5–10 mm. thick, paleaceous at apex, the scales carinate. Fronds numerous, 20–40 cm. long, long-stipitate: fertile blades pentagonal in outline, 8–20 cm. long, 6–20 cm. broad, tripartite, the distal portion deltoid from a decurrent-cuneate base, coarsely pinnatifid-lobate or 2-pinnatifid; basal portions nearly as large, inequilateral, forked near the base, the divisions nearly equal (or the upper larger), subentire to coarsely lobate or pinnatifid on one or both sides, the lobes few, mostly 5–10 mm. broad, acutish, usually glabrous, paler beneath; venation areolate; sporangia borne in a heavy continuous line. Sterile and small fronds with simpler blades, the parts fewer, much broader, and more rounded.

Steep rocky banks and forest slopes, at middle and higher elevations, Porto Rico; St. Thomas; St. Jan; Vieques:—Jamaica; Cuba; Hispaniola; Antigua; Guadeloupe; Dominica; Montserrat; Martinique. Mexico to Argentina.

15. **HYPOLEPIS** Bernh. Neu. Journ. Bot. Schrad. **12**: 34. 1806.

Mostly large semi-erect ferns, the rhizomes non-paleaceous, slender, and wide-creeping. Fronds distant, the stout elongate stipes continuous with the rhizome, half-woody, stramineous or highly colored, aculeate or not, glabrescent. Blades ample, of an oblong-ovate type, 1–4-pinnate, the primary pinnae few, subopposite, wide-spreading; ultimate segments lobed or pinnatifid, glabrous to densely hairy or viscid-glandular. Sori roundish, mostly small, marginal or nearly so, solitary, terminal upon the anterior veinlets of each group at the sinuses of the ultimate segments, usually somewhat indusiate by the turning back of a modified, roundish or oblong, marginal crenature, or the margin unchanged and not reflexed; receptacles punctiform or transversely oblong, elevated. (Greek, referring to the position of the sporangia beneath the scalelike indusiform crenatures.) About 40 species, of tropical and subtropical regions. Type species: *Lonchitis tenuifolia* Forst.

Stipe beset with numerous straight spines; pinnules narrowly lance-oblong, attenuate, thick-herbaceous to coriaceous.

Stipe weakly muricate; pinnules oblong, obtuse, very delicately herbaceous.

1. *H. repens*.

2. *H. tenerrima*.

1. **Hypolepis repens** (L.) Presl, Tent. Pter. 162. 1836.

Lonchitis repens L. Sp. Pl. 1078. 1753.

Dicksonia aculeata Spreng. Neu. Entd. **3**: 7. 1822.

Hypolepis aculeata J. Smith, Journ. Bot. Hook. **4**: 157. 1841.

Fronds rigidly ascending, subscandent, up to 5 or 6 m. long, the stipe and especially the stramineous or pale brown rachises freely beset with straight pungent spines up to 2.5 mm. long; blades very large, up to 1.5 m. broad, 3-4-pinnate; pinnae spreading, lance-deltoid, 40-80 cm. long, 20-50 cm. broad, stalked; secondary pinnae usually distant, spreading, narrowly lance-oblong, unequal, up to 30 cm. long, the rachis aculeolate and scantily hirsutulous beneath; pinnules distant, spreading, narrowly lance-oblong, long-attenuate, up to 6 cm. long, pinnate or deeply pinnatifid, the segments or lobes oblong, rounded or subtruncate, lightly crenate, glabrous or bearing a few distant hairs; sori rather small, marginal; indusia distinct, transversely linear-oblong to oblong or sublunate, thin, white, subentire. Leaf-tissue thick-herbaceous to coriaceous, sublustrous, paler beneath.

Rocky slopes in partial shade, at lower and middle elevations, Porto Rico:—Cuba; Guadeloupe; Dominica; Martinique; St. Kitts; Trinidad; Tobago. Florida; continental tropical America.

2. **Hypolepis tenerrima** Maxon, Journ. Wash. Acad. Sci. 14: 196. 1924.

Fronds weakly ascending, up to 2.5 m. long, the stipe 4-5 mm. thick, weakly muricate, cinnamomeous or light castaneous, lustrous, glabrate; blades 1.5 m. long or more, nearly 3-pinnate; pinnae triangular-oblong to oblong-ovate, acuminate, up to 80 cm. long and 40 cm. broad, stalked, the rachis distantly muricate or not; secondary pinnae distant, laxly spreading, the larger ones 16-20 cm. long, 5-7 cm. broad, the rachis minutely puberulous; pinnules distant, spreading, oblong, obtuse, the proximal ones largest, 2.5-4 cm. long, 10-14 mm. broad, nearly pinnate, narrowly joined; segments 7-11 pairs, subdistant, oblong, rounded-obtuse, crenately lobed halfway to the middle (the lobes 2 or 3 pairs below the crenate-dentate tip), scantily puberulous beneath; veins mostly 2-forked; sori small, submarginal, subtended by a minute, greenish, glabrous, membranous-herbaceous, indusiform lobule, borne at the extreme sinus. Leaf-tissue delicately herbaceous, dull dark green.

Shady slopes at lower and middle elevations, Porto Rico:—Hispaniola.

Hypolepis sp. A third species is represented by an immature specimen from the Luquillo Mountains (*Wilson 105*), its alliance being with the Jamaican plant wrongly referred to *H. Purdieana* Hook.

16. **NOTHOLAENA** R. Br. Prodr. Fl. Nov. Holl. 145. 1810.

Small, rock-loving, mainly xerophilous ferns, with glandular, densely ceraceous, paleaceous, or variously hairy foliage. Fronds rigid, uniform, the blades 1-4-pinnate and variously lobed or pinnatifid, linear to deltoid or pentagonal. Sori usually submarginal and roundish or oblong, borne at or near the tips of the unmodified veins or sometimes decurrent upon them, more or less confluent laterally. Proper indusium wanting, the leaf-margin either revolute and partially concealing the sporangia or flattish, the sporangia then somewhat protected by the hairy, scaly, or ceraceous indument. (Greek, spurious cloak, alluding to the lack of a true indusium.) About 60 species, mainly of arid regions of both hemispheres. Type species: *Acrostichum Marantae* L.

1. **Notholaena trichomanoides** (L.) R. Br. Prodr. Fl. Nov. Holl. 145. 1810.

Pteris trichomanoides L. Sp. Pl. 1074. 1753.

Notholaena trichomanoides subnuda Jenman, Bull. Bot. Dept. Jam. 36: 11. 1892.

Notholaena trichomanoides pilosa Kuhn & Christ, Bot. Jahrb. Engler 24: 133. 1897.

Notholaena trichomanoides sulphurea Brause, Ark. för Bot. 17: 69. 1922.

Rhizomes multicapital, the divisions short-creeping, slender, densely clothed with rigid, lustrous, fuscous, lance-attenuate, bristly-ciliate scales. Fronds numerous, close, rigidly spreading, 15–40 cm. long, the stipes much shorter than the blades, castaneous, wiry, often flexuous, deciduously stellate-paleaceous; blades narrowly linear, 10–30 cm. long, 1.5–3 cm. broad, pinnate, the rachis rigid, castaneous, laxly stellate-paleaceous; pinnae numerous, alternate, subdistant, stalked, at length deciduous, oblong to deltoid-oblong or rounded-hastate, subentire to obtusely pinnatifid, rigidly herbaceous, dull green above and at first thinly stellate-paleaceous, whitish-ceraceous beneath and with a heavy marginal line of stellate castaneous scales, usually also the entire under surface thickly tomentose-paleaceous; sori partially evident at maturity as a narrow marginal line.

Cliffs and dryish rocky slopes, sea level to middle elevations, Porto Rico;—Jamaica; Cuba; Hispaniola. Ascribed also to Mexico and Central America, probably in error.

17. **CHEILANTHES** Sw. Syn. Fil. 126. 1806.

Small xerophilous ferns, mostly with glandular-pubescent, tomentose, or imbricate-paleaceous foliage. Fronds uniform, rigidly erect-spreading; blades 1–4-pinnate, or 1-pinnate and variously pinnatifid, the ultimate segments often minute. Sori borne at the enlarged tips of the veins, usually numerous and narrowly confluent. Indusia formed of the revolute or recurved, often thin, more or less modified leaf-margin, or in some species the margin closely reflexed, giving rise abruptly to a membranous introrse proper indusium. (Greek, alluding to the marginal sori.) About 125 species, of temperate and tropical regions. Type species: *Cheilanthes micropteris* Sw.

1. **Cheilanthes microphylla** Sw. Syn. Fil. 127. 1806.

Adiantum microphyllum Sw. Prodr. 135. 1788.

Rhizome short-creeping, densely clothed with soft, recurved, narrowly linear, dull ferruginous scales. Fronds closely distichous, erect, 20–60 cm. long, the stipes nearly as long as the blades, ebeneous, wiry, lightly filiform-paleaceous, glabrate; blades linear-lanceolate to lance-deltoid, 10–45 cm. long, 3–12 cm. broad, 2–3-pinnate, the rachises similar to the stipe; pinnae mostly alternate, distant, spreading or curved-ascending, triangular-oblong, acuminate, the tip an enlarged, acute or acutish, subentire segment; pinnules spreading, simple, lobate below, or pinnate, the ultimate segments distant, 3–7 mm. long, oval to auriculate-oblong, mostly decurrent, herbaceous, with a sparse covering of short, whitish, moniliform hairs, these persistent beneath; sori confluent laterally, the indusia slightly modified, subcontinuous.

Walls, rocky banks, and open woods, at lower elevations, dry southwestern districts of Porto Rico; Desecheo; St. Thomas; St. Croix; Virgin Gorda;—Jamaica; Cuba; Hispaniola; St. Eustatius; St. Kitts; Guadeloupe; Montserrat; Bonaire; Curaçao. Southern United States and Mexico. Closely related forms occur in South America.

18. **ADIANTOPSIS** Fée, Gen. Fil. 145. 1852.

Terrestrial ferns of cliffs and rocky forests, the rhizomes thickish, erect or decumbent, firmly paleaceous. Fronds borne in several ranks, rigidly erect, the vascular parts slender, ebeneous, lustrous, glabrous. Blades 1–4-pinnate, lanceolate to ovate-pentagonal, or digitate-pinnate and orbicular, the segments small, distant, herbaceous, nearly glabrous, mostly auriculate; veins few, free, immersed. Sori terminal upon the veins, distant, small, the sporangia borne upon a punctiform receptacle; indusia oblong to suborbicular, membranous, consisting of a sharply reflexed, whitish, modified lobule of the leaf margin. (Greek, in allusion to its resemblance to *Adiantum*). About 15 species, mainly tropical American. Type species: *Adiantum pauperculum* Kunze.

1. **Adiantopsis paupercula** (Kunze) Fée, Gen. Fil. 145. 1852.*Adiantum pauperculum* Kunze, Farrnkr. 2: 65. pl. 127. 1850.*Hypolepis paupercula* Hook. Sp. Fil. 2: 73. pl. 88, C. 1852.*Cheilanthes paupercula* Mett. Fil. Hort. Lips. 52. 1856.

Rhizome short, curved-decumbent, the apex clothed with rigid, lance-acicular, striped, glossy brown scales. Fronds numerous, fasciculate, 20–70 cm. long, long-stipitate: blades deltoid-ovate, 10–30 cm. long, 6–25 cm. broad, 3–4-pinnate at lower base, gradually simpler above, the linear apex simply pinnate; pinnae distant, petiolate, oblique-spreading, the basal ones the largest, triangular, up to 15 cm. long and 6 cm. broad, strongly basiscopic; middle pinnae similar but narrower, linear-oblong and simply pinnate, or sometimes linear-triangular, with several produced proximal pinnules; segments distant, articulate, inserted upon very short lustrous brown petiolules, obliquely roundish-ovate to elliptic-oval, 3–6 mm. long, 2–4 mm. broad, dull green, paler beneath, glabrous, entire, or the fertile ones creately constricted at the sori; sori 1–5 per segment; indusia broadly reniform, thin.

On rocks along streams, Rio de Maricao, Porto Rico, altitude 500–600 meters (E. G. Britton 2509):—Jamaica; Cuba.

19. **ANISOSORUS** Trev. Att. Ist. Veneto II. 2: 166. 1851.

(ANTIOSORUS Roem.; Kuhn, Gruppe Chaetopt. 27. 1882.)

Large terrestrial ferns, the rhizome thick, short-creeping, nodose, green, fleshy, non-paleaceous, closely beset with spreading, septate, thin-walled, translucent, turgid hairs. Fronds few, close, ascending, succulent, the stipe stout, light green, hollow below, hairy like the rhizome. Blades large, deltoid-ovate, coarsely 2-pinnate-pinnatifid, succulent, membranous and translucent in drying, everywhere beset with thin-walled septate hairs. Veins free, pinnate, distant. Sori 2 to each segment, oblong to linear, submarginal, not reaching the sinus or the apex, the sporangia borne in a continuous line upon a filiform receptacle connecting the vein-ends. Indusia broad, membranous, formed as in *Pteris*. (Greek, signifying unequal sori.) A single species, the type, *Pteris laciniata* Willd.

1. **Anisosorus hirsutus** (L.) Underw. & Maxon.*Lonchitis hirsutus* L. Sp. Pl. 1078. 1753.*Pteris laciniata* Willd. Sp. Pl. 5: 397. 1810.*Pteris hirsuta* J. Smith, Journ. Bot. Hook. 4: 165. 1841. Not Poir. 1804.*Antiosorus hirsutus* Kuhn, Gruppe Chaetopt. 27. 1882.

Fronds 1–2.5 m. long, the stipes shorter than the blades, dull stramineous in drying and the hairs flat and tortuous; blades up to 1.5 m. long and 1 m. broad; pinnae few, alternate, laxly ascending, ovate-oblong to unequally deltoid, the lower ones the largest, stalked, basiscopic; pinnules apart, oblong to linear-deltoid, acutish to long-acuminate, mostly 6–12 cm. long and 2–3 cm. broad, semiadnate, and coarsely pinnatifid, or the larger basal ones sessile, up to 20 cm. long, subpinnate, with pinnately lobed segments; segments in general rounded-oblong, 5–9 mm. broad, subfalcate, pellucid-punctate, the margins entire.

Wet forested ravines and stream banks, at lower to higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada. Mexico to Bolivia. TOMATO-FERN.

20. **PTERIDIUM** Scop. Fl. Carn. 169. 1760.

Coarse terrestrial ferns of open or scantily wooded, dryish, acid-soil situations, often forming thickets, the rhizomes non-paleaceous, slender, woody,

branched, wide-creeping underground. Fronds stout, erect or ascending, borne singly, not jointed to the rhizome, the stipes stout, half-woody; blades triangular or deltoid-ovate to elongate, pinnately decompose, the main pinnae subopposite, the ultimate segments entire or lobed, more or less coriaceous, with revolute margins. Sori linear, marginal, continuous, arising from a transverse veinlike receptacle connecting the ends of the forked free veins; indusia continuous, double, the outer one prominent, formed by the reflexed membranous modified margin of the blade, the inner one delicate, usually minute, borne upon the receptacle, nearly concealed by the numerous sporangia, facing outward. (Greek, an ancient name applied to ferns.) Species 6 or 8, of wide distribution. Type species: *Pteris aquilina* L.

Pinnules distant, long-caudate; segments narrowly linear, distinct. 1. *P. caudatum*.

Pinnules close, short-caudate; segments oblong to linear; the larger ones joined by low arclike wings. 2. *P. arachnoideum*.

1. **Pteridium caudatum** (L.) Maxon, Proc. U. S. Nat. Mus. 23: 631. 1901.

Pteris caudata L. Sp. Pl. 1075. 1753.

Pteris aquilina caudata Hook. Sp. Fil. 2: 196. 1858.

Fronds suberect, 2–3 m. high or more, the stipe nearly as long as the blade, stout, light brown, glabrous; blades 1–1.5 m. broad, 3–4-pinnate; pinnae numerous, spreading, mostly triangular, stalked, the rachis wiry, dull stramineous, glabrous; pinnules divaricate, distant, stalked, deltoid-oblong, pinnatisect to pinnate, and abruptly caudate, or often linear and simple; ultimate segments in general, narrowly linear, 1–5 cm. long, 1–4 mm. broad, distant, distinct (or the outer ones slightly decurrent and obliquely joined), coriaceous, glabrous above, loosely silky-strigose to subglabrous beneath; margins revolute, often strongly so.

Thickets, clearings, and dryish open situations, at lower and middle altitudes, Porto Rico:—Jamaica; Cuba; Bahamas; Bermuda; Hispaniola. Florida; Mexico and Central America. Various reported from the Lesser Antilles.

2. **Pteridium arachnoideum** (Kaulf.) Maxon, Journ. Wash. Acad. Sci. 14: 89. 1924.

Pteris arachnoidea Kaulf. Enum. Fil. 190. 1824.

Pteridium aquilinum esculentum of most American authors. Not *Pteris esculenta* Forst. 1786.

Fronds rigidly ascending, 1–2 m. long, the stipe much shorter than the blade, stout, glabrate, dull stramineous to reddish-castaneous; blades 0.8–1.5 m. broad, nearly 4-pinnate at base, elongate; pinnae rigid, spreading, triangular, the rachis subscabrous; pinnules divaricate, close, sessile, triangular-oblong, acuminate, short-caudate, mostly pinnatisect, the segments in general linear-oblong, 0.5–3 cm. long, 2–5 mm. broad, connected by low arclike costal wings, coriaceous, glabrescent above, loosely sericeo-tomentose beneath, the costae and costules callos-marginate, laxly clothed with short septate hairs; margins strongly revolute, corrugate.

Thickets and forest borders, at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Trinidad. Mexico to Argentina.

21. **ONYCHIUM** Kaulf. Enum. Fil. 144. 1824.

Terrestrial. Rhizomes erect to free-creeping, paleaceous. Fronds of medium size, ascending, caespitose or subdistant, long-stipitate, the vascular parts firm, all stramineous, or the stipes brown below and lustrous. Blades of a deltoid type, finely 3–4-pinnate, dimorphous, the segments of sterile blades very numerous, linear to flabellate-cuneate, those of fertile blades fewer, simpler, larger,

and broader, loosely ceraceous beneath or not. Veins free, few, distant. Sori 2 to each segment, oblong to narrowly linear, submarginal, not reaching the apex, the sporangia borne in a thick continuous line upon an evident receptacle connecting the vein ends. Indusia formed as in *Pteris*, membranous, broad, often meeting medially, at length reflexed or not. (Greek, alluding to the clawlike segment tips). Species 6, all but one natives of the Old World. Type species: *Onychium capense* Kaulf.

1. **Onychium strictum** Kunze, Farrnkr. 2: 11. 1848.

Cryptogramma stricta Prantl; Salom. Nom. Gefässkrypt. 141. 1883.

Rhizome erect or decumbent, 2–6 cm. long, 5–10 mm. thick, woody, brown-paleaceous. Fronds numerous, fasciculate, spreading, 40–90 cm. long, the stipes long, stramineous, distantly punctate-paleaceous; blades deltoid-ovate, subpentagonal, 20–40 cm. long, 12–30 cm. broad, 3–4-pinnate and pinnatisect; basal pinnae largest, deltoid, inequilateral, the upper pinnae narrower, all stalked; sterile segments cuneate, pinnatifid or inciso-serrate to deeply bifid or trifid, the lobes triangular to linear, decurrent, cuspidate, membrano-herbaceous, subglabrous; fertile segments larger, up to 2 cm. long, 1.5–4 mm. broad, elliptic-cuneate, long-attenuate at base, the sterile apex inciso-serrate to deeply 3-dentate, rarely entire; sori oblong to linear, 2–7 mm. long; indusia delicate, translucent, nearly or quite meeting.

Sink-holes and at the base of cliffs in moist forests, at lower and middle elevations, Porto Rico:—Cuba; Hispaniola.

22. **HISTIOPTERIS** (Ag.) J. Smith, Hist. Fil. 294. 1875.

Rhizome slender, free-creeping, squarrose-paleaceous. Fronds few, distant, erect or subscaudent, usually large, the stipe short, stout, atropurpureous to golden brown, highly lustrous, glabrous. Blades elongate-triangular, large, coarsely 2–4-pinnate, all the divisions opposite, distant, spreading, sessile, the basal major pinnules often broad, short, and stipuliform; rachises like the stipe or paler. Veins partially areolate, the basal ones arcuately joined, the others free to the margin, or all but the outermost united in one or more rows of oblique polygonal areoles, without included veins. Sori as in *Pteris*; spores diplanate. (Greek, sail-fern, perhaps alluding to the form of the stipular pinnules). Species 4 or 5, of wide distribution. Type species: *Pteris vespertilionis* Lab.

1. **Histiopteris incisa** (Thunb.) J. Smith, Hist. Fil. 295. 1875.

Pteris incisa Thunb. Prodr. Fl. Cap. 171. 1800.

Litobrochia incisa Presl, Tent. Pter. 149. 1836.

Rhizome woody, 5–10 mm. thick; scales numerous, bright brown, lance-attenuate. Fronds mostly 1–4 m. long; blades up to 3 m. long or more, 1–2 m. broad, 2–4-pinnate, variable in size and dissection, the pinnules in general lance-linear to triangular-oblong, long-acuminate, pinnatisect to pinnately lobed, the segments rounded-obtuse, relatively broad, and freely areolate in sterile blades, mostly elongate-triangular and acute if fertile, the heavy submarginal line of sporangia extending nearly to the apex. Leaf-tissue rigidly herbaceous, glabrous, glaucous beneath.

Brushy slopes and forest openings, at higher elevations, Porto Rico:—Jamaica; Guadeloupe; Dominica. Continental tropical America generally, and tropical and subtropical regions of the Old World. Highly variable locally, as well as regionally.

23. **PTERIS** (Tourn.) L. Sp. Pl. 1073. 1753.

Mainly coarse ferns of moist forests and rocky slopes, the rhizomes usually stout, creeping to erect, paleaceous. Fronds erect or ascending, fasciculate, mostly large, the stipes firm, terete or angulate, stramineous or greenish—rarely atropurpureous—usually lustrous and glabrescent. Blades 1–4-pinnate, elongate to ternate or broadly pentagonal, often only the basal parts decompose and of complex structure, the segments small to large, non-articulate in most species; veins lax and distant to close, often prominulous, free, or mostly joined in angular areoles, or only the basal ones anastomosing. Sori usually linear, the sporangia borne in a continuous close row along both margins upon a filiform intramarginal receptacle connecting the ultimate vein-ends, usually falling short of both sinus and apex; paraphyses present or wanting; spores triplanate. Indusia linear, introrse, membranous, formed of the highly modified reflexed leaf-margins. (Greek, ancient name for a fern.) Species about 250, mainly tropical. Type species: *Pteris longifolia* L.

- A. Blades simply pinnate, the pinnae narrowly linear, not lobed or pinnatifid.

Pinnae 5–15 cm. long, 3–10 mm. broad; veins free.

Pinnae 20–45 cm. long, 1.5–5 cm. broad; veins freely areolate toward the margins.

- B. Blades 1–4-pinnate, at least the larger pinnae deeply pinnatifid.

1. Veins all free.

- a. Basal pinnae not branched, pinnate on both sides.

Blades 5–30 cm. long, coarsely 2-pinnate at base, the other pinnae mostly 3-foliolate or simple.

Blades 0.5–1.2 meters long, 3–4-pinnate at base, the upper pinnae gradually simpler.

- b. Basal pinnae 2-partite, i. e. with a single proximal branch, the branches and other pinnae deeply pinnatifid, with narrow segments.

Pinnae 2–5 pairs, the axils aculeolate; lowermost vein of segments arising from the costa.

Pinnae 7–15 pairs, the axils unarmed; veins all springing from the costule.

2. Veins (at least the basal pair) joined.

Basal pinnae 2-partite; basal veins joined in a narrow costal arc, the others free.

Basal pinnae not 2-partite; veins joined in several rows of angular areoles.

Blades lance-oblong, the basal pinnae no larger than the others, deeply pinnatifid or pinnately parted; basal veins uniaurcate.

Blades deltoid-ovate, pentagonal, fully 2-pinnate at base, the basal pinnae much the largest; basal veins 2–3-arcuate.

1. *P. longifolia*.

2. *P. grandifolia*.

3. *P. mutilata*.

4. *P. deflexa*.

5. *P. pungens*.

6. *P. quadriaurita*.

7. *P. biaurita*.

8. *P. crassipes*.

9. *P. altissima*.

1. **Pteris longifolia** L. Sp. Pl. 1074. 1753.

Pteris stipularis L. Sp. Pl. 1074. 1753.

Pteris semihirta Link, Fil. Hort. Berol. 50. 1841.

Pteris ophioderma Fée, Mém. Foug. 10: 15. 1865.

Rhizome short-creeping, densely clothed with yellowish to dark rusty-brown, linear-deltoid, hair-pointed scales, similar but smaller scales usually extending to the rachis, these imperfectly deciduous. Fronds several, rigidly ascending, mostly 0.3–1 m. long, the stipe shorter than the blade, stramineous; blades 25–75 cm. long, 10–30 cm. broad, oblong to lance-elliptic or oblanceolate, usually attenuate at base, evenly acuminate at apex or terminating abruptly in a linear segment, pinnate; pinnae simple, very numerous, horizontal, narrowly linear, straight or subfalcate, 5–15 cm. long, articulate, sessile from a cordate (rarely hastulate short-stipulate) base, the fertile ones 3–6 mm. broad, with ample whitish denticulate indusium extending nearly to the narrow acutish tip, the sterile ones 5–10 mm. broad, lightly crenulate-serrulate, scariose-marginate; veins elevated, translucent, mostly 1- or 2-forked, the branches close. Leaf-tissue rigidly herbaceous, dark green, glabrate.

Rocky banks and cliffs, usually in dryish, open or slightly shaded situations, at lower to higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe. Also Mexico and sparingly southward to Brazil. The var. *bahamensis* (Ag.) Hieron. occurs in Florida, the Bahamas, and Cuba. Bermuda and St. Thomas specimens previously referred to *P. longifolia* apparently all pertain to *P. vittata* L., which see.

2. *Pteris grandifolia* L. Sp. Pl. 1073. 1753.

Litobrochia grandifolia J. Smith, Journ. Bot. Hook. 4: 163. 1841.

Heterophlebium grandifolium Fée, Gen. Fil. 140. pl. 11, A, f. 9–12. 1852.

Rhizome stout, creeping, laxly clothed with thin lance-attenuate fulvous-brownish scales. Fronds suberect, the stipe about half as long as the blade, stout (up to 1 cm. thick), terete, stramineous or pale olivaceous from a darker scaly base, glabrate; blades narrowly oblong, 1–2 m. long, 35–75 cm. broad, pinnate, the rachis pale to dark stramineous, deeply sulcate, glabrescent; pinnae numerous, mostly oblique, alternate to subopposite, 2–6 cm. apart on either side, narrowly linear-attenuate from a roundish or broadly cuneate base, 20–45 cm. long, 1.5–5 cm. broad, mostly sessile, the lower ones stalked, excavate below, the upper ones slightly reduced, the terminal one conform; margins thinly cartilaginous, entire; veins very close, elevated beneath, spreading, mostly once forked below the middle, freely anastomosing beyond, the areoles numerous in sterile pinnae, small, elongate, directed toward the margin; sori continuous nearly to the long-acuminate or subcaudate tip, the narrow indusium reflexed at maturity. Leaf-tissue membrano-herbaceous, translucent, sublustrous, glabrous.

Moist forest borders, roadside banks, and half-shaded ravines at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Grenada; Trinidad. Mexico to Peru.

3. *Pteris mutilata* L. Sp. Pl. 1076. 1753.

Rhizome ascending, 3–5 mm. thick, the apex clothed with small, erect, linear-attenuate, castaneous scales. Sterile fronds numerous, spreading or ascending, 10–30 cm. long, the stipes slender, sulcate, stramineous, from a castaneous base, as long as the blades or longer; blades triangular or pentagonal in outline, 5–15 cm. long, nearly as broad, coarsely 2-pinnate at base, the basal pinnae largest, inequilateral, narrowly deltoid-caudate, the pinnules mostly simple, oblong to linear, 5–7 mm. broad, strongly callous-marginate, entire, finely repand, the rounded tip mucronate; second and third pairs of pinnae often pinnate or lobed at base, the others entire; veins distant, oblique, immersed, once forked; leaf-tissue chartaceo-herbaceous, dark green above, sublustrous, glabrous. Fertile fronds long-stipitate, 30–75 cm. long, erect, usually far surpassing the sterile; blades up to 30 cm. long, similar to the sterile or exactly deltoid; pinnules distant, narrower than the sterile, narrowly decurrent, the terminal ones up to 10 cm. long; sori continuous to the cuspidate naked tip; indusia pale, relatively broad.

Moist or dryish rock clefts, in partial shade, at lower to middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola.

4. *Pteris deflexa* Link, Hort. Berol. 2: 30. 1833.

Rhizome stout, erect, densely clothed with glossy fuscous pale-margined scales. Fronds 1–2 m. long, the stipe stoutish, smooth, dark stramineous, often angulate, nearly as long as the blade; blades deltoid-pentagonal, acuminate, up to 1.2 m. long, nearly as broad, subternate, 3–4-pinnate at base, the rachises unarmed, minutely and deciduously squamulose; basal pinnae largest, unequally deltoid, up to 55 cm. long, produced below; succeeding pinnae gradually simpler, the upper ones small, lance-attenuate, pinnatifid, the conform terminal one slightly larger; pinnules in general linear-attenuate to lance-acuminate, 5–15 cm. long, sessile, pinnately parted, the segments oblong to linear-oblong from a broader base, oblique, falcate, 2–4 mm. broad at middle, strongly fertile ones with a free mucronate tip, sterile ones callous-marginate, sharply and distantly serrate, all subdecurrent, the sinuses usually narrow and subacute; veins distant,

forked, the lowest springing from the costa, often twice forked; indusia pale, broad, firm. Leaf-tissue firmly herbaceous or subcoriaceous, glabrous or nearly so, paler beneath.

Mt. Torresilla (*Hioram* 258) and Mt. Morales, near Utuado (*Britton & Marble* 1064), Porto Rico:—Hispaniola. South America. Polymorphic, as currently understood.

5. *Pteris pungens* Willd. Sp. Pl. 5: 387. 1810.

Pteris acuminata Desv. Ges. Naturf. Freund. Berlin Mag. 5: 324. 1811.

Pteris biaurita pungens Christ, Bot. Jahrb. Engler 24: 99. 1897.

Pteris longicaudata Christ in Pitt. Prim. Fl. Costar. 3: 21. 1901.

Rhizome short, ascending, 2 cm. thick, densely clothed with glossy, linear fulvous-castaneous, denticulate, carinate scales. Fronds rigidly ascending, up to 1.4 m. long, the stipe at least equaling the blade, deeply sulcate anteriorly, here stramineous, or glossy castaneous throughout, distantly aculeolate, the rachis similarly armed, especially in the axils of the pinnae; blades suborbicular to broadly pentagonal-oblong, 30–60 cm. long, 30–50 cm. broad, pinnate; pinnae 2–5 pairs and a conform terminal one, subopposite, oblique, subsessile, the basal pair 2-partite, the others simple, narrowly lanceolate to elliptic-linear, 20–35 cm. long, 4–8 cm. broad, abruptly caudate (the tip 2–10 cm. long, 3–5 mm. broad, obtusely serrate), pinnately parted; segments mostly linear, slightly oblique, subfalcate, confluent at their dilatate base (the sinuses narrowly acute in sterile blades, acutish or rotund in fertile), the middle ones 2–4 cm. long, 4–8 mm. broad, the lower ones evenly reduced, those of the proximal base short, decurrent, often obsolete; margins of sterile segments lightly callous, subentire below the rounded, obtusely serrate tip; veins elevated, mostly once forked, 1 or 2 short basal ones arising proximally from the costa; sori narrowly linear, reaching the base of the serrate-dentate tip.

Mountain forests, at middle and higher elevation, Porto Rico:—Hispaniola; Guadeloupe; Martinique; Trinidad. Mexico to Bolivia. The Jamaica plant reported under this name by Urban is *P. Swartziana* Ag.

6. *Pteris quadriaurita* Retz. Obs. Bot. 6: 38. 1791.

Pteris repandula Link, Fil. Hort. Berol. 56. 1841.

Pteris biaurita repandula Kuhn, Bot. Jahrb. Engler 24: 99. 1897.

Rhizome erect or oblique, woody, the apex clothed with small acicular castaneous paler-margined scales. Fronds several, up to 1.5 m. long, suberect, the stipe often nearly as long as the blade, deeply sulcate, light to dark brown, or stramineous upward; blades oblong, up to 1 m. long and 50 cm. broad, pinnate; pinnae 7–15 pairs and a conform terminal one, mostly short-petiolulate, opposite, oblique, adjacent, all but the basal ones simple, narrowly deltoid-oblong and acuminate, broader on the lower side, 15–30 cm. long, very deeply pinnatifid throughout, the short-caudate tip (1–3 cm.) excepted; basal pinnae 2-partite, or occasionally each with 2 elongate proximal pinnules, the rachises strongly elevated, stramineous, lustrous; segments oblong to linear, 1–3 cm. long, 3–6 mm. broad, straight or subfalcate, rounded-obtuse, entire, lightly callous-marginate, close, narrowly joined, with acute or acutish sinuses; veins numerous, oblique, close, mostly once forked, arising from the costule, all free; sori barely or not meeting at sinus, not reaching the tip, the indusium pale, relatively broad. Leaf-tissue thin to firm-herbaceous, translucent.

Shady roadside banks and wooded ravines, at lower to higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Martinique. Florida; continental tropical America and Old World tropics. Here regarded in its conventional sense. Many segregates have been proposed, and the synonymy and relationship of the forms are greatly confused.

7. *Pteris biaurita* L. Sp. Pl. 1076. 1753.

Rhizome woody, suberect, the apex obscurely clothed with pale fuscous-carinate scales. Fronds several, suberect, 0.7–1.5 m. long, the stipes as long as

the blades, usually stramineous from a darker, slightly scaly base, sulcate, smooth; blades oblong or deltoid-oblong, 30–80 cm. long, 15–40 cm. broad, pinnate; pinnae 6–15 pairs and a conform terminal one, opposite, ascending, all but the basal ones sessile, simple, narrowly oblong-lanceolate to lance-attenuate, broader on the lower side, 10–25 cm. long, deeply pinnatifid throughout, the long-caudate linear tip (2–8 cm.) excepted; basal pinnae short-stalked, obliquely 2-partite 1–3 cm. from base, the proximal pinnule the shorter; segments narrowly oblong to linear, 1–3 cm. long, 3–5 mm. broad at middle, straight or subfalcate, rounded-obtuse, entire, lightly callous-marginate, the sterile ones with acutish sinuses, the fertile with rounded ones, all broadly joined, the costal wing 2–3 mm. broad on either side; veins elevated, the basal ones invariably joined in a narrow costal arc with several excurrent simple branches, the others close, oblique, once forked; sori extending from the sinus nearly to the apex, the indusium narrow, often reflexed. Leaf-tissue thin-herbaceous, translucent, nearly glabrous.

Partially shaded banks and wooded rocky slopes, at lower to higher elevations, Porto Rico; St. Thomas:—Jamaica; Cuba; Hispaniola; St. Kitts; Saba; Guadeloupe; Dominica; Montserrat; Martinique. Mexico to Brazil. Old World tropics.

8. ***Pteris crassipes*** Ag. Recens. Pter. 59. 1839.

Litobrochia crassipes Fée, Gen. Fil. 135. 1852.

Rhizome undescribed. Fronds 2–3 m. long; stipes up to 2 m. long, stout, nearly smooth, glabrous, dark stramineous; blades lance-oblong, 1 m. long or more, 50 cm. broad, pinnate-pinnatifid; pinnae slightly oblique, opposite, adjacent, subequal, the lower middle ones slightly the largest, oblong, short-acuminate, 25–30 cm. long, 10–12 cm. broad, short-stalked, deeply pinnatifid or pinnately parted; lateral pinnae abruptly discontinuous above, the apex an enlarged conform terminal pinna; segments linear-acuminate, 5–6 cm. long, 7–10 mm. broad at middle, straight or subfalcate, sometimes irregularly lobed, narrowly joined, with broad rounded sinuses, the sterile ones shallowly serrate-crenate; basal veins uniaurcate, the areole very narrow; areoles of segments in 1 or 2 rows, with excurrent, oblique, free branches; sori continuous to the short, shallowly serrate-crenate apices; indusium thin, narrow. Leaf-tissue thin-herbaceous, subglabrous, translucent, the veins dark, slightly prominulous.

Forested banks of the Rio Maricao, Porto Rico, at 600 meters elevation:—Martinique; St. Vincent (?).

9. ***Pteris altissima*** Poir. in Lam. Encycl. 5: 722. 1804.

Pteris Kunzeana Ag. Recens. Pter. 62. 1839.

Litobrochia Kunzeana Fée, Gen. Fil. 135. 1852.

Rhizome stout, ascending, woody, densely clothed with rigid, subulate, glossy, castaneous, rusty-margined scales. Fronds several, rigidly spreading, 1.5–3 m. long; stipes stout, arcuate at base, smooth, sulcate, stramineous; blades deltoid-ovate, pentagonal, up to 1.5 m. long and 1.2 m. broad, 2-pinnate at base; basal pinnae much the largest, up to 65 cm. long, unequally deltoid (produced below), long-stalked, with 1 to several pairs of distant, oblique, broadly lanceolate to deltoid-oblong, acuminate, petiolate pinnules, these deeply pinnatifid to pinnately parted, or rarely the largest ones pinnate; second pair of pinnae often pinnate, the others (4–8 pairs) mostly pinnatifid only, broadly cuneate at base; terminal pinna conform; fertile segments mostly lance-attenuate, oblique, 4–10 mm. broad, with rotund sinuses, the sterile tips sharply serrate; sterile segments broader, close, with acute sinuses, lightly callous-marginate; basal veins 2–3-arcuate; areoles of segments in 3 or 4 rows, excurrent free veins few and short. Leaf-tissue usually firm-herbaceous, glabrate, paler beneath, the veins prominent, semitranslucent.

Moist shady hillsides and rocky ravines in forests, at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe, Montserrat; Martinique. Mexico to Brazil and Bolivia.

***Pteris vittata* L.**, a common Old World species confused until recently with *P. longifolia*, has escaped from cultivation and become well established in St. Thomas, Bermuda, Dominica, Martinique, Barbados, Trinidad, eastern Brazil, Florida, Alabama, and Louisiana. It differs mainly in its fewer, evenly long-tapering, non-articulate pinnae, these more sharply toothed and more oblique to the rachis.

24. **HEMIONITIS** L. Sp. Pl. 1077. 1753.

Small, mostly soft-herbaceous ferns of open situations, the rhizomes erect to short-creeping, laxly paleaceous. Fronds several, fasciculate, subdimorphous, the fertile rigidly erect and long-stipitate, the sterile rotate, short-stalked. Blades palmately or pinnately lobed (rarely pinnate), the divisions few and broad, mostly hairy; veins anastomosing, uniform, the areoles elongate-polygonal, without included venules. Sporangia in copious superficial lines, following the course of the veins throughout; indusia and paraphyses wanting. (Ancient Greek name for an Old World species of *Asplenium*.) Species 8 or 9, chiefly of tropical America. Type species: *Hemionitis palmata* L.

1. **Hemionitis palmata** L. Sp. Pl. 1077. 1753.

Rhizome short, suberect, 5-10 mm. thick, laxly clothed with tawny linear scales. Fronds several, the fertile ones rigidly erect, 15-35 cm. long, the stipes several times as long as the blades, dark brown, sublustrous, deciduously villous, relatively thick, inflated; blades pentagonal in outline, 5-15 cm. long and broad, tripartite, the distal portion ovate to oblong-lanceolate and coarsely lobed below the acuminate subentire apex, or hastate, a viviparous bud borne at one side of the base; basal portions inequilateral, forked near the base, the upper usually larger, both similar to the apical division, coarsely crenate or shallowly lobed, the sinuses sometimes gemmiparous; costae dark brown, evident in their lower half; leaf-tissue soft-herbaceous, sparsely hirsute above, freely villous-hirsute beneath. Sterile fronds smaller, nearly prostrate, short-stipitate, the blades 3- or 5-lobed, the lobes short, rounded or acutish.

Grassy slopes and rocky banks among shrubs, at lower to middle elevations, Porto Rico; Tortola; St. Thomas; St. Jan; St. Croix:—Jamaica; Cuba; Hispaniola; St. Martin; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad. Mexico to Bolivia. STRAWBERRY-FERN. STAR-FERN.

25. **TRISMERIA** Fée, Gen. Fil. 164. 1852.

Coarse ferns of half-open situations, the rhizomes stout, erect, freely paleaceous. Fronds numerous, cespitose, erect, the stipes short, thick, firm, divaricate-paleaceous. Blades subdimorphous, large, elongate, the pinnae simple to 3-foliolate, the divisions narrow, subentire. Veins free, repeatedly dichotomous, the branches very close, arcuate, impressed, translucent, excurrent to minute cartilaginous serratures. Sori following the course of the veins throughout, non-indusiate, at length confluent and suffused with loose waxy powder. (Greek, alluding to the 3-foliolate pinnae). Species 2, confined to tropical America. Type species: *Trismeria aurea* Fée.

1. **Trismeria trifoliata** (L.) Diels in Engl. & Prantl, Pflanzenfam. 14: 265. 1899.

Acrostichum trifoliatum L. Sp. Pl. 1070. 1753.

Gymnogramme trifoliata Desv. Ges. Naturf. Freund. Berlin Mag. 5: 305. 1811.

Trismeria argentea Fée, Gen. Fil. 165. pl. 14A, f. 1. 1852.

Trismeria aurea Fée, op. cit. 165. pl. 14A, f. 2.

Ceropteris trifoliata Kuhn; Hieron. Bot. Jahrb. Engler 22: 398. 1896.

Fronds 0.5–2 m. long, the stipe and rachis rigid, castaneous to atropurpureous, sulcate, lustrous; blades oblong to linear, 0.4–1.5 m. long, 12–20 cm. broad, obtuse at apex, attenuate at base, 1–2-pinnate; pinnæ distant, ascending, stalked, simple to 2-foliolate or 3-foliolate (the middle pinnule longest), the divisions narrowly linear, attenuate, 8–15 cm. long, 4–10 mm. broad, finely callous-serrulate, thick-herbaceous, glabrous and lustrous above, strongly costate beneath, the sterile ones non-ceraceous; sori early confluent, partly concealed by the loose, whitish to pale yellow powder.

Shrubby banks, often along streams, at middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola. Mexico to Argentina.

26. **PITYROGRAMMA** Link, Handb. Gewächss. 3: 19. 1833.

(*CEROPTERIS* Link, Fil. Hort. Berol. 141. 1841.)

Small to medium-sized ferns of dryish banks and semi-open situations, the short-creeping to erect rhizomes covered with narrow attenuate scales. Fronds cespitose, uniform, not articulate to the rhizome, rigidly erect or ascending, the stipes mostly dark, firm, lustrous. Blades 1–3-pinnate, linear to deltoid-pentagonal, covered with white, ochraceous, or bright yellow powder beneath (or rarely hairy), sometimes glandular above, usually devoid of scales; veins free. Sori following the course of the veins, non-indusiate, usually confluent at early maturity. (Greek, alluding to the furfuraceous appearance of the sori.) About 18 species, mainly of the American tropics. Type species: *Acrostichum chrysophyllum* Sw.

Fronds laxly ascending, the stipes weak, much shorter than the blades.

Fronds erect or rigidly spreading, the stipes rigid, nearly or quite as long as the blades.

Blades densely covered beneath with bright yellow, waxy powder.

Blades covered with white or whitish powder beneath.

Pinnules mostly acute, serrate or acutely pinnatifid; leaf-tissue chartaceous or membrano-herbaceous.

Pinnules mostly rounded-obtuse, entire to obtusely pinnatifid; leaf-tissue coriaceous.

1. *P. sulphurea*.

2. *P. chrysophylla*.

3. *P. calomelanos*.

4. *P. tartarea*.

1. **Pityrogramma sulphurea** (Sw.) Maxon, Contr. U. S. Nat. Herb. 17: 173. 1913.

Acrostichum sulphureum Sw. Prodr. 129. 1788.

Gymnogramma sulphurea Desv. Ges. Naturf. Freund. Berlin Mag. 5: 305. 1811.

Ceropteris sulphurea Fée, Gen. Fil. 183. 1852.

Gymnogramma sulphurea argentea Christ; Urban, Symb. Ant. 9: 340. 1925.

Rhizome curved-ascending, 1–3 cm. long, 5–10 mm. thick, obscurely paleaceous. Fronds numerous, closely fasciculate, laxly ascending, 20–40 cm. long, the stipes short, slender, castaneous, lustrous; blades lance-linear to ovate-lanceolate, 15–30 cm. long, 3–12 cm. broad, acuminate-attenuate at apex, abruptly narrowed at base, 2-pinnate and pinnatifid, the rachis weak, castaneous; pinnæ spreading or laxly ascending, mostly distant, short-stalked, the middle ones largest, up to 6 cm. long and 2.5 cm. broad, narrowly triangular to deltoid-ovate, acuminate to acutish, the rachis narrowly foliaceous-marginate, ceraceous beneath; pinnules distant, trapeziform or broadly ovate-oblong from an inequilateral base, the larger ones obliquely pinnatifid, with 2 or 3 pairs of flabellate-cuneate segments, the lobes sharply retuse; leaf-tissue membranous, light green above, beneath thinly covered with citron-yellow powder; sori linear, confined to the ultimate veins.

Damp or dryish earth banks, under shrubs or in the shade of rocks, at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola. Ascribed also to Guadeloupe. Sometimes cultivated. GOLD-FERN.

2. **Pityrogramma chrysophylla** (Sw.) Link, Handb. Gewächsh. 3: 19. 1833.

Acrostichum chrysophyllum Sw. Journ. Bot. Schrad. 1800²: 14. 1801.

Gymnogramma chrysophyllum Kaulf. Enum. Fil. 74. 1824.

Ceropteris chrysophylla Link, Fil. Hort. Berol. 143. 1841.

Rhizome suberect, 2–6 cm. long, 1–1.5 cm. thick, the apex clothed with thin, yellow-brown, lance-attenuate scales. Fronds numerous, cespitose, recurved, 30–60 cm. long, the stipes often longer than the blades, slender but rigid, purplish-castaneous, highly lustrous; blades elongate-deltoid, long-acuminate, 15–30 cm. long, 8–20 cm. broad, 2-pinnate and pinnatifid, the rachis like the stipe; pinnae spreading or laxly ascending, short-stalked, mostly contiguous, the large basal ones distant or not, elongate-triangular, up to 10 cm. long and 4 cm. broad, long-acuminate, the rachis narrowly foliaceous-marginate, ceraceous beneath; pinnules subdistant, oblique or spreading, lance-elliptic or ovate-oblong from an inequilateral cuneate base, rounded-obtuse or acutish, distantly crenate-serrate, or the large ones deltoid-oblong and deeply pinnatifid, the segments oblique, serrate; leaf-tissue membranous or thin-herbaceous, dark green above, beneath densely covered with deep yellow powder, this at first concealing the linear sori.

Shrubby banks at lower elevations, Porto Rico; St. Croix:—Jamaica; Hispaniola; Nevis; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Tobago. Costa Rica to Argentina. GOLD-FERN.

3. **Pityrogramma calomelanos** (L.) Link, Handb. Gewächsh. 3: 20. 1833.

Acrostichum calomelanos L. Sp. Pl. 1072. 1753.

Gymnogramma calomelanos Kaulf. Enum. Fil. 76. 1824.

Ceropteris calomelaena Link, Fil. Hort. Berol. 141. 1841.

Neurogramme calomelanos Diels in Engl. & Prantl, Pflanzenfam. 14: 264. 1899.

Rhizome erect or decumbent, up to 6 cm. long and 1.5 cm. thick, the apex clothed with small linear yellowish-brown scales. Fronds fasciculate, erect, 0.3–1 m. high or more, the stipes nearly as long as the blades, stout, atropurpureous, highly lustrous, the rachis similar; blades lanceolate to deltoid-ovate, acuminate, 20–60 cm. long, 10–25 cm. broad, 2-pinnate; pinnae numerous, erect-spreading, adjacent, or the lower and middle ones subdistant, these the largest, triangular-lanceolate, attenuate, up to 15 cm. long and 5 cm. broad, stalked; pinnules subdistant, oblique, mostly lance-elliptic or narrowly oblong from an inequilateral cuneate base, acute or acuminate, serrate or the larger ones obliquely pinnatifid, the lobes acute; leaf-tissue chartaceous or membrano-herbaceous, lustrous above, beneath loosely whitish-coraceous, the powder at first concealing the copious sporangia, these at length confluent.

Rocky banks and open, shrubby slopes, at lower and middle elevations, Porto Rico; Tortola; Vieques; St. Thomas; St. Jan; St. Croix:—Jamaica; Cuba; Bahamas; Hispaniola; Saba; St. Eustatius; St. Kitts; Antigua; Guadeloupe; Dominica; Montserrat; Martinique; Barbados; St. Lucia; St. Vincent; Grenada; Trinidad; Tobago. Mexico to southern Brazil; tropical Africa. SILVER-FERN.

4. **Pityrogramma tartarea** (Cav.) Maxon, Contr. U. S. Nat. Herb. 17: 173. 1913.

Acrostichum tartareum Cav. Descr. Pl. 242. 1802.

Gymnogramma tartarea Desv. Ges. Naturf. Freund. Berlin Mag. 5: 305. 1811.

Ceropteris tartarea Link, Fil. Hort. Berol. 142. 1841.

Neurogramme tartarea Diels in Engl. & Prantl, Pflanzenfam. 14: 264. 1899.

Rhizome erect or oblique, 3–8 cm. long, 1–2 cm. thick, the apex clothed with rigid, lance-acicular, fuscous or dark brown, lustrous scales. Fronds several, rigidly spreading, 0.5–1.5 m. long or more, the stipes often as long as the blades, stout, dark brown to atropurpureous, highly lustrous, brown-paleaceous at the

arcuate base; blades elongate-deltoid, acuminate, 30–80 cm. long, 10–30 cm. broad, 2-pinnate, the rachis like the stipe; pinnae horizontal to arcuate-ascending, mostly stalked, adjacent or apart, the lower ones the largest, distant, elongate-deltoid, up to 20 cm. long and 8 cm. broad; pinnules distant, spreading, adnate, oblong to oblong-linear, rounded-obtuse or acutish, entire or crenate at base, or in large specimens sessile, narrowly triangular-caudate, and coarsely pinnatifid, the lobes rounded-obtuse; leaf-tissue coriaceous, dark green and lustrous above, beneath densely white-ceraceous; sporangia numerous, finally confluent.

Open rocky slopes and banks, at higher elevations, Porto Rico; St. Croix;—Jamaica; Cuba; Hispaniola; Guadeloupe; Martinique. Mexico to Bolivia and Brazil.

27. **PSILOGRAMME** Kuhn, Gruppe Chaetopt. 12. 1882.

Rhizomes erect to free-creeping, non-paleaceous, clothed with septate hairs. Fronds several, usually fasciculate, small and erect to large and of indefinite vinelike growth. Blades mostly septate-hairy, linear and pinnate-pinnatifid to 2–3-pinnate and variously pinnatisect, the pinnae subopposite to regularly alternate, ascending to sharply retrorse; segments mostly cuneate in outline, shallowly lobed and pluricostate to flabellate-multifid, the lobes linear and unicostate, emarginate or not. Veins free. Sori linear, following the course of the veins throughout, non-indusiate, at length confluent; paraphyses wanting. (Greek, alluding to the non-indusiate sori.) About 35 species of tropical America. Type species: *Psilogramme elongata* (Hook. & Grev.) Kuhn.

1. **Psilogramme portoricensis** Maxon, Contr. U. S. Nat. Herb. 17: 412. pl. 15. 1914.

Rhizome erect, 1–2 cm. high, clothed with turgid, acicular, dark castaneous hairs (1–2 mm. long). Fronds several, suberect, 5–18 cm. long, the elongate stipes laxly hispid with yellowish-brown hairs; blades lanceolate, acuminate, 2.5–10 cm. long, 1–3 cm. broad, essentially 2-pinnate, the rachis dark, hispid; pinnae 7–14 pairs, alternate, deltoid to deltoid-oblong, rounded at apex, the rachis flexuous, greenish-marginate above the base; segments few, large, imbricate, transversely oblong to obliquely rounded-obovate, flabellately lobed, soft-herbaceous, strongly hispid on both sides with stiff, flattish, stramineous, few-celled hairs; veinlets few, terminating far from the margin.

Extreme summit of El Yunque, Porto Rico, altitude 1,110 meters. Endemic. First reported from the same locality (by Urban) as *Gymnogramme hispidula*, which is a South American species, *Psilogramme hispidula* (Kunze) Kuhn.

28. **DIPLAZIUM** Sw. Journ. Bot. Schrad. 1800²: 61. 1801.

Medium to large ferns of upright habit, the rhizomes creeping to erect and massive, paleaceous at apex; scales with elongate cells, often deeply colored, without distinct lumina, the walls all equally thickened. Fronds stipitate, not jointed to the rhizome; blades simple to 4-pinnate, linear to deltoid, the divisions small to very large, papyraceous to coriaceous or spongiose-herbaceous, often succulent. Veins free or (in extra-limital species) partly connivent or obliquely areolate without included venules. Sori elliptical to elongate-linear, lateral in attachment, partly or wholly double, at least those of the basal veins or distal branches partially so, the two parts opposed along a common receptacle, facing outward. Indusia mostly membranous, conformable to the sori, attached laterally throughout, opening outward. (Greek, signifying double.) Species about 350, widely distributed in the tropics of both hemispheres. Type species: *Asplenium plantaginum* L.

Blades simple.

Blades 1-2-pinnate.

A. Pinnae subentire to crenate or serrate.

1. Blades 15-50 cm. broad; pinnae subequilateral at base.

Pinnae chartaceous, mostly stalked, falcate at the caudate tip; veins excurrent to margin; sori dark brown, very unequal.

Pinnae papyraceous, sessile, straight, never caudate; veins not reaching the margin; sori bright ferruginous, symmetrical in arrangement.

2. Blades 5-15 cm. broad; pinnae strongly inequilateral at base.

B. Pinnae crenately lobed to pinnate-pinnatifid.

Blades 5-15 cm. broad.

Blades 20-80 cm. broad.

1. Pinnae crenate-lobate to deeply pinnatifid.

Blades deltoid-ovate; pinnae strongly inequilateral at base; segments oblique.

Blades of an oblong type; pinnae equilateral at base; segments spreading.

Pinnae mostly alternate; segments serrulate; indusia erose.

Pinnae subopposite; segments crenate-serrate; indusia deeply fimbriate-ciliate.

2. Pinnae pinnate nearly throughout, the pinnules semiadnate to stalked.

Costae of pinnules fibrillose-paleaceous; leaf tissue glabrous.

Costae naked; leaf-tissue and veins hirtellous beneath.

1. *D. plantaginifolium*.

2. *D. grandifolium*.

3. *D. centripetale*.

4. *D. unilobum*.

4. *D. unilobum*.

5. *D. arboreum*.

6. *D. striatum*.

7. *D. L'Herminieri*.

7. *D. L'Herminieri*.

8. *D. expansum*.

1. *Diplazium plantaginifolium* (L.) Urban, Symb. Ant. 4: 31. 1903.

Asplenium plantaginifolium L. Syst. Nat. ed. 10, 2: 1323. 1759.

Asplenium plantagineum L. Sp. Pl. ed. 2, 1537. 1763.

Diplazium plantagineum Sw. Journ. Bot. Schrad. 1800²: 62. 1801.

Rhizome erect or curved-ascending, 5-10 cm. long, 1-2 cm. thick, with copious thick wiry roots, the apex clothed with short, rigid, very thick, blackish scales. Fronds 4-8, imbricate-cespitose, erect, 30-60 cm. long, the stipes usually as long as the blades or longer, gray from a darker base, glabrous; blades simple, oblong-lanceolate to lance-linear, 15-30 cm. long, 3.5-7 cm. broad, acuminate-cuspidate, broadly cuneate or roundish-truncate at base, the costa stout, percurrent, elevated and dark stramineous beneath, often viviparous at base; margins subentire or sinuate-dentate in the lower half, crenate-serrate to deeply serrate above; veins oblique-spreading, the branches (5-7) alternate, pinnately arranged, parallel, all excurrent to the margin, prominulous beneath; sori narrowly linear, the longest (2-3 cm.) borne upon the first distal veinlet and mostly diplazioid, the shorter ones usually single; indusia very narrow, membranous, brownish. Leaf-tissue chartaceo-herbaceous, dark green and sublustrous above, glabrous.

Wet rocky forest slopes, at middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Martinique; Trinidad. Mexico to Bolivia and southern Brazil. In two instances noted the fronds are pinnately lobed at base, approaching *D. Riedelianum* Kunze.

2. *Diplazium grandifolium* Sw. Journ. Bot. Schrad. 1800²: 62. 1801.

Asplenium grandifolium Sw. Prodr. 130. 1788.

Rhizome erect, 5-10 cm. long, 1.5-2.5 cm. thick, the apex closely invested with thick, soft, dark brown, ovate-oblong, acuminate scales. Fronds several, cespitose, erect-arching, 0.7-1.1 m. long, the stipes one-half to nearly as long as the blades, stout, dull blackish-brown, divaricate-paleaceous at base; blades lanceolate-oblong, short-acuminate, 30-70 cm. long, 15-30 cm. broad, truncate at base, pinnate, the rachis stout, glabrate; pinnae 10-15 pairs, mostly alternate, approximate or apart, spreading, narrowly oblong, long-acuminate at apex (the tip usually subcaudate and falcate), 8-15 cm. long, 2-4 cm. broad, subequally rounded-truncate at base (or broadly rounded below), the lower ones stalked (2-7 mm.), the middle ones usually sessile, the upper ones gradually smaller, semiadnate, finally confluent at the pinnately incised apex; margins sinuate-

crenate or (rarely) deeply crenate in the basal part, crenate-serrate at apex, or the apex sharply serrate in sterile pinnae; veins oblique-spreading, the branches (4-7) alternate, pinnately arranged, nearly parallel, excurrent to the margin; sori linear, unequal, the longest (1-1.5 cm.) borne upon the first distal veinlet, diplazioid, the others single; indusia membranous, broad. Leaf-tissue firmly chartaceous, dark green and lustrous above, pale beneath, glabrous.

Moist rocky forest, Luquillo Mountains, Porto Rico, at lower elevations:—Jamaica; Cuba; Hispaniola; Trinidad; Tobago. Costa Rica to Venezuela. There is at hand a single Porto Rican specimen (*Wilson 318*).

3. *Diplazium centripetale* (Baker) Maxon.

Asplenium centripetale Baker in Hook. & Baker, Syn. Fil. ed. 2, 490. 1874.
Diplazium domingense Brause in Urban, Symb. Ant. 7: 156. 1911.

Rhizome erect, massive, up to 30 cm. high, densely brown-paleaceous at apex. Fronds cespitose, erect-spreading, 0.7-1.4 m. long, the stipes much shorter than the blades, succulent, yellowish brown, densely clothed with long, spreading, light to dark brown, tortuous, linear scales; blades oblong-lanceolate to oblong, 0.4-1 m. long, 20-50 cm. broad, abruptly short-acuminate at apex, slightly narrowed at base, pinnate, the rachis stout, sulcate, deciduously fibrillose-paleaceous; pinnae 15-25 pairs, horizontal, close, alternate to opposite, straight, narrowly oblong to ligulate, acuminate or acute at apex, subcordate-truncate at the nearly equilateral base or subauriculate below, sessile, the larger ones 10-25 cm. long, 2.5-5 cm. broad, the 1-3 basal pairs half or one-third as long, distant, deeply short-excavate at lower base, the reduced apical ones few; margins broadly crenate or sinuate-crenate in the basal third of the pinnae or nearly throughout, finely sinuate at apex; costae bisulcate beneath, laxly yellowish-paleaceous; veins wide-spreading, prominulous, the branches (4-8) pinnately fasciculate, not reaching the margin, the basal pair subopposite; sori in symmetrical groups, the basal pair equal, 10-18 mm. long, nearly all diplazioid; indusia narrow. Leaf-tissue membrano-papyraceous, clear green.

Wet forest slopes, at middle and higher elevations, Porto Rico:—Jamaica; Hispaniola; Guadeloupe; Martinique; Trinidad. Previously listed from Porto Rico as *D. celtidifolium* Kunze, a species of northern South America.

4. *Diplazium unilobum* (Poir.) Hieron. Hedwigia 59: 332. 1917.

Asplenium unilobum Poir. in Lam. Encycl. Suppl. 2: 505. 1811.
Asplenium semihastatum Kunze; Mett. Abh. Senckenb. Ges. Frankfurt 3: 206. 1859.
Asplenium cubense Hook. Sp. Fil. 3: 253. pl. 207. 1860.
Diplazium arboreum unilobum Kuhn, Bot. Jahrb. Engler 24: 109. 1897.
Diplazium aemulum Underw. & Maxon, Bull. Torrey Club 29: 583. 1902.
Diplazium semihastatum C. Chr. Ind. Fil. 239. 1905.

Rhizome erect to curved-ascending, up to 12 cm. long, and 1.5 cm. thick, with many thick wiry roots below; scales numerous, tufted, rich brown, lance-attenuate. Fronds 4-8, rigidly spreading, 25-70 cm. long, the stipes somewhat shorter than the blades, olivaceous or dull stramineous from a brownish scaly base; blades oblong, to oblong-lanceolate, 15-50 cm. long, 5-15 cm. broad, long-acuminate, pinnate; pinnae 12-22 pairs, mostly alternate, approximate to distant, oblique-spreading, subfalcate, short-stalked, trapezio-oblong to obliquely deltoid-linear, acutish to attenuate at apex, strongly inequilateral at base (narrowly cuneate below, truncate-auriculate above), the auricle deltoid-ovate, acutish, or sometimes oval and free, the pinna often obliquely and deeply crenate beyond, the crenations and other margins sharply dentate-serrulate; veins oblique, 1-3-forked (pinnate in the auricle and larger crenations), translucent; sori oblique, arcuate, several pairs in the basal lobes, nearly solitary elsewhere, subdistant, the larger ones diplazioid, 4-9 mm. long; indusia narrow, firm. Leaf-tissue membranous to chartaceous, pale to bright green, glabrous.

Moist shady banks, at middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola. Extremely variable. Small plants of wet cliffs, with few, membranous pinnae, the lower ones distant and parted at base, are var. *hymenodes* (Mett.) Maxon (*A. hymenodes* Mett.), connected with the typical forms by numerous intermediates.

5. **Diplazium arboreum** (Willd.) Presl, Tent. Pter. 114. 1836.

Asplenium arboreum Willd. Sp. Pl. 5: 320. 1810.

Asplenium Shepherdii Spreng. Nov. Act. Acad. Caes. Leop. Carol. 10: 231. pl. 17, f. 5, 6. 1821.

Diplazium Shepherdii Link, Hort. Berol. 2: 70. 1833.

Rhizome erect or curved-ascending, 4–10 cm. long, 1.5–2 cm. thick, bearing many thick roots below; scales appressed, oblong-acuminate, blackish brown. Fronds several, cespitose, erect-spreading, 50–85 cm. long, the stipes a little shorter than the blades, stout, rigid, sulcate, stramineous from a dark brown, paleaceous base; blades elongate-deltoid or subovate, 30–45 cm. long, 20–35 cm. broad, evenly acuminate at apex, pinnate; pinnae few, spreading, the 2–4 lowermost pairs the largest, subopposite, short-stalked (2–6 mm.), lanceolate to narrowly ovate, 10–20 cm. long, 2–6 cm. broad, acuminate-attenuate at apex, inequilateral at base (truncate-auriculate above, excavate or narrowly cuneate below), coarsely crenate-lobate or deeply pinnatifid nearly throughout, the lobes 5–10 mm. broad at base, acutish, distantly and shallowly serrate; middle pinnae sessile, shorter, closer, the upper ones fully adnate, finally confluent at the deeply incised apex; veins oblique, pinnate, simple or once forked, elevated; sori linear, arcuate, 4–10 mm. long, distant, often solitary, occupying the first distal vein, or 1–6 additional pairs borne in the largest lobes, only the basal sorus diplazioid; indusia narrow. Leaf-tissue thin-chartaceous, translucent, glabrous.

Moist forest slopes, often near rocky streams, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad. Mexico to Paraguay.

6. **Diplazium striatum** (L.) Presl, Tent. Pter. 114. 1836.

Asplenium striatum L. Sp. Pl. 1082. 1753.

Diplazium truncatum Presl, Tent. Pter. 114. 1836.

Diplazium striatum truncatum Hieron. Hedwigia 59: 328. 1917.

Rhizome stout, erect or ascending, up to 30 cm. long, the apex densely clothed with lance-attenuate, dark brown scales. Fronds several, erect-arching, 1–2 m. long, the stipes mostly shorter than the blades, yellowish brown from a darker scaly base, sulcate; blades narrowly to broadly oblong, acuminate, 0.7–1.4 m. long, 25–50 cm. broad, pinnate-pinnatifid or at base nearly 2-pinnate; pinnae numerous, mostly alternate and horizontal, narrowly oblong-acuminate, 13–25 cm. long, 3–6 cm. broad, short-stalked, deeply pinnatifid throughout, or subpinnate at the truncate or subcordate base; segments usually close and spreading, oblong, narrowly joined, 6–12 mm. broad at the acute sinuses, rounded or truncate and distally acutish at apex, the margins distantly serrulate, or the basal segments subdistant, reduced or not, constricted at base, free or faintly joined; costae medial, percurrent; veins about 10 pairs, simple or 1–2-forked, the lowest pair excurrent just above the sinus; sori copious, extending from the costa more than halfway to the margin; indusia ample, thin, entire. Leaf-tissue membranous to thick-herbaceous, glabrous, or minutely puberulous beneath.

Moist shady ravines, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad. Mexico to northern South America. Polymorphic, as currently regarded.

7. **Diplazium L'Herminieri** Hieron. in Urban, Symb. Ant. 4: 648. 1911; Hedwigia 59: 331. 1917.

Diplazium grammatoides Fée, Mém. Foug. 11: 43. pl. 11. 1866. Not Presl, 1851.

Rhizome curved-ascending, 2 cm. thick; scales numerous, blackish brown, lustrous, deltoid-ovate to oblong-attenuate, rigidly and retrorsely denticulate-

ciliate. Fronds several, laxly arching, 0.7–1.3 m. long, the stipes shorter than blades, dull brown or fuscous from an atropurpureous base, laxly paleaceous; blades ovate-oblong, long-acuminate, 50–80 cm. long, 25–50 cm. broad, slightly narrowed at base, pinnate-pinnatifid, or fully 2-pinnate, the rachis fuscous, squamulose, sometimes viviparous toward the tip; pinnae 12–18 pairs, approximate to distant, laxly spreading, subopposite, short-stalked, the smaller ones narrowly oblong, long-acuminate, pinnatisect at base, deeply pinnatifid beyond, the pinnules oblique-spreading, oblong, rounded or acutish at tip, crenate-serrate, the veins simple or once forked; larger pinnae 20–30 cm. long, 6–9 cm. broad, pinnate, the pinnules (12–18 pairs) oblique-spreading, alternate, subdistant, oblong-acuminate, attenuate at tip, 1–1.5 cm. broad, the basal ones free, the others partially adnate and decurrent, all pinnatifid, the lobes rounded, subentire; veins divaricate, few, distant; sori linear, mainly basal, 2–3.5 mm. long; indusia very narrow, strongly fimbriate-ciliate. Leaf-tissue membranous, sub-lustrous, very dark in drying, glabrous; costules fibrillose-paleaceous beneath.

Moist rocky forests, sometimes among palms, at middle and higher elevations, Porto Rico:—Cuba; Guadeloupe. Part of the Porto Rican material was first reported as *Athyrium conchatum* Fée, which is *Diplazium pectinatum* (Fée) C. Chr., known only from Jamaica and Hispaniola.

8. ***Diplazium expansum*** Willd. Sp. Pl. 5: 354. 1810.

Asplenium expansum Presl, Rel. Haenk. 1: 46. 1825.

Rhizome suberect, 15–20 cm. long, thick, the apex densely clothed with thick elongate brown scales. Fronds several, cespitose, arching, 1.2–2 m. long, the stipes much shorter than the blades, slender, olivaceous or yellowish brown from a darker base, pubescent; blades narrowly ovate, long-acuminate, 0.8–1.5 m. long, 40–80 cm. broad, 2-pinnate, the rachis deeply sulcate above, pubescent; pinnae 10–15 pairs, mostly alternate, spreading, stalked (1–1.5 cm.), oblong-acuminate, the larger ones 20–40 cm. long, 8–15 cm. broad, fully pinnate below the coarsely pinnatifid apical third, the rachis septate-hirtellous; pinnules spreading, approximate to distant, subequilateral, narrowly deltoid-oblong, acuminate to attenuate at apex, subtruncate at base, the larger ones petiolulate, 4–8 cm. long, 1.5–2 cm. broad, pinnatifid halfway to the costa, the segments broadly oblong, subtruncate, acutish distally, distantly denticulate; costules, veins, and lower leaf-surface yellowish-hirtellous; veins 4 or 5 pairs, oblique, simple, prominulous beneath; sori 2–4 pairs, the basal pair longest (3–5 mm.), decussate, diplazioid, the others mostly simple; indusia broad, thin, laxly erose-ciliate. Leaf-tissue membranous-herbaceous, dark to bright green, glabrous above.

Mountain forest, Alto de la Bandera, near Adjuntas, Porto Rico (*Britton & Shafer 2098*):—Jamaica; Cuba. Northern South America. So referred with doubt. There are numerous closely related species of this group in the Greater Antilles and northern South America which at present are not clearly distinguished.

Diplazium tenue Desv. was reported from Porto Rico by Hieronymus on a Sintenis specimen (no. 1396, in part) later referred to *D. striatum truncatum* (Presl) Hieron., the other element of the number being *D. L'Herminieri* Hieron.

29. **HEMIDICTYUM** Presl, Tent. Pter. 110. 1836.

Large ferns of upright habit, the rhizome stout, erect, closely paleaceous, the scales brownish, subclathrate. Fronds cespitose, stipitate, not jointed to the rhizome; blades glabrous, coarsely once-pinnate, the pinnae opposite, sessile. Veins spreading, parallel, close, mostly once-forked near the base, the branches joined halfway to the margin, giving rise beyond to numerous trapeziform or elongate hexagonal areoles (without included veins), the outermost series transversely joined by a subcontinuous intramarginal venule. Sori narrowly linear, confined to the main vein-branches, simple. Indusia lateral in attachment, very narrow, conformable to the sori, membranous. (Greek, half a net, referring to the venation.) Type and sole species: *Asplenium marginatum* L.

1. **Hemidictyum marginatum** (L.) Presl, Tent. Pter. 111. pl. 3, f. 24. 1836.

Asplenium marginatum L. Sp. Pl. 1082. 1753.

Asplenium limbatum Willd. Sp. Pl. 5: 310. 1810.

Asplenium Mikani Presl, Del. Prag. 1: 177. 1822.

Hemidictyum peruvianum Presl, Epim. Bot. 74. 1851.

Hemidictyum limbatum Presl, Epim. Bot. 74. 1851.

Diplazium marginatum Diels in Engl. & Prantl, Pflanzenfam. 14: 229. 1899.

. Not Blume, 1828.

Fronds several, up to 3 m. long, erect-arching, the stipes half as long as the blades, stout (2 cm. thick at base), stramineous or light castaneous from a dark scurfy-paleaceous base; blades oblong, 1–2 m. long, 0.5–1 m. broad, imparipinnate; pinnae spreading, 6–15 cm. apart, repand, linear-oblong to ligulate, 25–55 cm. long, 6–12 cm. broad, abruptly acuminate-cuspidate, all but the uppermost ones cordate-clasping, these obliquely truncate distally, the terminal pinna conform, enlarged or not, cordate to broadly cuneate at base; margins subentire, scariose; sori up to 4 cm. long, close, parallel. Leaf-tissue bright green, succulent, papyraceo-membranous and fragile in drying, glabrous.

Rocky stream-beds and slopes, in forests at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad; Tobago. Mexico to southern Brazil.

30. **ASPLENIUM** L. Sp. Pl. 1078. 1753.

Small to large, terrestrial or epiphytic ferns, mainly of moist ravines and forest slopes, the rhizomes creeping to erect, paleaceous, the scales firm, clathrate, with dark partition cell-walls. Fronds rosulate to erect-spreading, not articulate, uniform; blades simple to 1–4-pinnate or variously pinnatifid, the rachises dark and lustrous to green and succulent, often narrowly foliaceous-marginate; pinnae or segments articulate or not, entire to variously incised, cleft, or pinnatifid, glabrous or nearly so. Sori oval to narrowly linear, nearly straight, borne upon the free, usually oblique, ultimate veins, usually below their tips; indusia invariably present, lateral, as long as the sori, usually membranous. (Ancient Greek name, indicating curative properties for ailments of the spleen.) Nearly 600 species, mainly tropical and subtropical. Type species: *Asplenium Trichomanes* L.

Blades simple.

Blades 1–3-pinnate.

A. Blades 1–4 cm. broad.

1. Blades of a linear type.

Fronds difform, the sterile ones short and prostrate; rachis green.

Fronds alike, ascending; rachis brownish to ebeneous.

a. Rachis ebeneous to atropurpureous, yellowish-alate ventrally.

Pinnae serrately incised; sori usually confined to the proximal side.

Pinnae crenate-dentate; sori opposite in pairs.

b. Rachis dull brownish, green-alate throughout.

2. Blades of a deltoid type.

B. Blades 4–40 cm. broad.

1. Pinnae entire to pinnatifid.

Blades whitish-septate-hirtellous beneath.

Blades not hirtellous.

a. Rhizome creeping.

Pinnae coriaceous, lustrous, the costae fibrillose-paleaceous.

Pinnae thin, dull, the costae not paleaceous.

Stipe and rachis brown; pinnae glandular beneath.

Stipe and rachis olivaceous; pinnae glabrous.

b. Rhizome erect to decumbent.

Pinnae equilateral at base, entire throughout.

Pinnae inequilateral at base, sinuate to pinnatifid.

a. Fronds not rooting at tip.

Blades linear, the rachis obviously greenish-alate.

1. *A. serratum*.

2. *A. dentatum*.

3. *A. formosum*.

4. *A. heterochroum*.

5. *A. Sintenisii*.

6. *A. pumilum*.

6. *A. pumilum*.

7. *A. Serra*.

8. *A. laetum*.

9. *A. obtusifolium*.

10. *A. integerrimum*.

11. *A. pseudoerectum*.

- Blades linear-oblong to deltoid-oblong; rachis obscurely alate, if at all.
 Pinnæ squamulose beneath, the apical one large, conform. 12. *A. sanguinolentum*.
 Pinnæ not squamulose, the apical ones usually reduced and confluent.
 Blades ovate-oblong or deltoid-oblong; indusia membranous, brownish. 13. *A. abscissum*.
 Blades narrowly to broadly oblong; indusia coriaceous, whitish.
 Pinnæ dentate to crenate-serrate. 14. *A. salicifolium*.
 Pinnæ serrate to serrately incised or lobed. 15. *A. auritum*.
 b. Fronds rooting at the flagelliform tip. 16. *A. radicans*.
 2. Pinnæ 1-2-pinnate.
 Fronds rooting at the flagelliform tip; stipe and rachis atropurpureous, highly lustrous. 17. *A. uniseriale*.
 Fronds not rooting at tip; stipe and rachis not atropurpureous, dull.
 a. Rachis widely green-alate ventrally; pinnæ alternate, sessile or nearly so.
 Pinnules spreading, sessile, coarsely pinnatisect or deeply incised. 18. *A. cristatum*.
 Pinnules oblique, mostly stalked, obliquely pinnate, the segments narrower and mostly distant. 19. *A. myriophyllum*.
 b. Rachis not alate; pinnæ subopposite, stalked. 20. *A. cuneatum*.

1. *Asplenium serratum* L. Sp. Pl. 1079. 1753.

Rhizome erect, enveloped in a large mass of brownish, tomentose, finely fibrous roots, the apex clothed with thin, tufted, dark brown, narrowly linear-attenuate scales. Fronds often numerous, of shuttle-cock habit, simple, 0.5-1 m. long, nearly exstipitate; blades linear-oblancoolate, acuminate or abruptly short-acuminate at apex, 7-14 cm. broad above the middle, evenly attenuate downward, the costa stout, elevated, carinate downward, the narrowly alate basal part passing gradually into the very short, thick, triquetrous, greenish or dull purplish stipe; leaf-tissue chartaceo-herbaceous and translucent in drying, glabrous, usually repand, the margins cartilaginous, dentate or finely crenate-serrate; veins oblique, mostly once-forked near the base, the branches straight, close, one or both fertile half or two-thirds the distance to the margin, the sori narrowly linear, castaneous, often confluent at maturity; indusia very narrow, firm, whitish.

Moist rocks, logs, and trees, in mountain forests, usually along streams, at lower and middle elevations, Porto Rico; St. Thomas:—Jamaica; Cuba; Hispaniola; St. Eustatius; Guadeloupe; Montserrat; Martinique; Grenada; Trinidad; Tobago. Mexico to Brazil.

2. *Asplenium dentatum* L. Sp. Pl. 1080. 1753.

Asplenium barbadense Jenman, Gard. Chron. III. 15: 134. 1894.

Plants gregarious, the rhizomes erect, 0.5-1.5 cm. long, 2-5 mm. thick, minutely paleaceous at apex. Fronds numerous, usually difform, the sterile ones short and laxly spreading or prostrate, 3-12 cm. long, short-stipitate, the fertile ones ascending, 10-25 cm. long, the stipe sometimes as long as the blade, delicate, greenish from a brownish base; blades linear to linear-oblong, blunt or acutish at tip, scarcely reduced at base, 8-18 cm. long, 1-3 cm. broad, pinnate, the rachis delicate, greenish, sulcate; pinnæ few (6-13 pairs), subopposite to alternate, horizontal to oblique, delicately stalked, oblong to trapeziform-oblong or exactly obovate, 5-15 mm. long, 3-8 mm. broad, mostly rounded-obtuse at apex, narrowly to broadly cuneate or subrectangular at base, those of fertile blades mostly distant, the terminal one confluent, crenate-lobate or obliquely incised; venation flabellate to pinnate; margins beyond the base serrate to dentate or sometimes crenate; sori 2-5 pairs, very oblique, close, up to 7 mm. long. Leaf-tissue grayish green, membrano-herbaceous.

Moist limestone cliffs, caves, and ravines, often along streams in partial shade, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Bermuda; Hispaniola; Guadeloupe; Barbados. Florida; Yucatán and northeastern Guatemala. In the Lesser Antilles plants the fertile and sterile fronds tend to be uniform.

3. ***Asplenium formosum*** Willd. Sp. Pl. 5: 329. 1810.

Asplenium nanum Willd. Sp. Pl. 5: 323. 1810.

Asplenium subalatatum Hook. & Arn. Bot. Beechey Voy. 312. 1840.

Rhizome short, curved, the apex clothed with erect, acicular or lance-attenuate, bicolorous scales. Fronds numerous, closely cespitose, of shuttle-cock habit, 12–35 cm. long, the stipes very short, atropurpureous, deciduously scarious-marginate; blades pinnate, linear to narrowly linear-oblong, 10–30 cm. long, 2–3.5 cm. broad, acutish to acuminate at apex, gradually narrowed downward from the apical third, the lower pinnae often minute; rachis atropurpureous, slender, yellowish-alate ventrally; pinnae 25–50 pairs, subopposite or alternate, nearly horizontal, close or apart, sessile, mostly linear-oblong from an obliquely rectangular or inequilateral-cuneate base, 10–18 mm. long, 3–6 mm. broad at base, acutish, serrately incised except at the narrowly dimidiate lower base, the distal teeth mostly bifid; sori large, linear-oblong, 2–6, usually 1–3 and confined to the very oblique, simple, proximal veins; indusia silvery, ample. Leaf-tissue herbaceous in drying, semitranslucent.

Mossy rocks along water-courses and crevices of wet shady cliffs, at lower to higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Montserrat; Martinique. Mexico to Argentina; also, tropical Africa and southeastern Asia.

4. ***Asplenium heterochroum*** Kunze, Linnaea 9: 67. 1834.

Asplenium muticum Gilbert, Amer. Bot. 4: 86. 1903.

Rhizome short, erect or ascending, densely clothed with erect, linear-attenuate, dark brown scales. Fronds several or numerous, fasciculate, ascending, 12–40 cm. long, the stipe very short, ebeneous or dark purplish brown, lustrous; blades linear, 10–35 cm. long, 1–2 cm. broad, simply pinnate, acute or acuminate at apex, attenuate downward, the rachis colored like the stipe, narrowly alate ventrally, the wings thin, yellowish brown; pinnae 10–40 pairs, mostly subopposite, horizontal or slightly reflexed, subdistant, sessile, obliquely oblong from a rectangular or broadly cuneate base, 5–11 mm. long, 3–5 mm. broad, rounded-obtuse at apex, subauriculate, the margins sharply crenate-dentate; veins (distal basal ones excepted) simple, oblique; basal pinnae greatly reduced, subflabelliform, broadly cuneate; sori inframedial, linear-oblong, the indusia ample, whitish, erose-dentate. Leaf-tissue membrano-herbaceous, translucent.

Limestone hills, at lower elevations, Porto Rico:—Bermuda; Cuba; Hispaniola (?). Peninsular Florida. The Porto Rican specimens, though smaller than most of the others, are like them in essential characters. Listed by Urban as *A. Trichomanes* L.

5. ***Asplenium Sintenisii*** Hieron. Hedwigia 60: 251. 1918.

Rhizome short-creeping, 2–6 cm. long, 5–10 mm. thick; scales numerous, lance-attenuate from a cordate base, brownish. Fronds numerous (15–50), ascending, subcespitose, 20–40 cm. long, the stipes short, dull brownish, very narrowly alate, 1–1.5 mm. thick; blades linear-attenuate, 15–35 cm. long, 2–3.5 cm. broad at middle, tapering both ways but more gradually upward, pinnate, the rachis dull brownish, very narrowly and evenly greenish-alate throughout; pinnae 30–40 pairs, sessile, the lower ones reduced and apart, the middle ones trapeziform-oblong, 1–1.5 cm. long, rounded-obtuse at apex, 5–8 mm. broad at the straight inner margin of the subrectangular or unequal, broadly cuneate base, subauriculate, the auricle dentate, the margins elsewhere serrate-crenate; succeeding pinnae evenly reduced, the extreme apical ones minute; veins oblique, those of the basal auricle mostly twice dichotomous or subpinnately branched, the others mostly simple, oblique; sori narrowly elliptic to linear, up to 5 mm. long, 1 mm. broad, those of the auricle mostly diplazoid; indusium whitish-

hyaline, firm-membranous, entire. Leaf-tissue dark green, thin-herbaceous, semitranslucent.

On trees and rocks, wet mountain forests, at upper elevations, Porto Rico:—Jamaica; Hispaniola. Listed by Urban as *A. lunulatum* Sw. var. *majus* Mett., and subsequently as *A. auricularium* Desv.

6. ***Asplenium pumilum*** Sw. Prodr. 129. 1788.

Asplenium anthriscifolium Jacq. Coll. Bot. 2: 103. pl. 2, f. 3, 4. 1788.

Asplenium humile Spreng. Neu. Entd. 3: 6. 1822.

Rhizome usually erect, 3–10 mm. high, 2–5 mm. thick, with an apical tuft of minute, brown-costate, acicular or filiform scales. Fronds several, cespitose, spreading, mostly 5–20 cm. long, the stipes usually longer than the blades, castaneous below, greenish and narrowly greenish-marginate above, deciduously dark-fibrillose; blades variable, in smaller forms deeply 3-lobed or 3-parted, deltoid-ovate, acute, 3–5 cm. long, 2.5–4 cm. broad, the basal divisions obliquely ovate and subentire, the apical deltoid-ovate from a cuneate base and subentire, or deltoid-hastate and lobed above the base. Larger blades broadly pentagonal, 5–12 cm. long, 5–9 cm. broad, with 2–4 pairs of oblique-spreading pinnae (the apex acuminate, obliquely incised, confluent), the basal ones stalked, unequally deltoid, coarsely lobed below or on both sides, the first proximal lobe sometimes free; minor lobes mostly subtruncate, the margins in general lightly crenate-dentate; venation very oblique, subpinnate; sori copious, linear, nearly medial, up to 1 cm. long; indusia ample, thin, whitish, deciduously septate-ciliate. Leaf-tissue soft-herbaceous, light green, whitish-septate-hirtellous on both sides.

Dryish or moist, shady, rocky banks, at lower and middle elevations, Porto Rico; Vieques; St. Thomas; St. Jan.:—Jamaica; Cuba; Hispaniola; St. Martin; Antigua; Guadeloupe; Dominica; Montserrat; Martinique; Grenada; Tobago. Florida; Mexico to Brazil.

7. ***Asplenium Serra*** Langsd. & Fisch. Icon. Fil. 16. pl. 19. 1810.

Asplenium woodwardioideum Gardn. Lond. Journ. Bot. 1: 547. 1842.

Asplenium insigne Liebm. Dansk. Vid. Selsk. Skrift. V. 1: 246. 1849.

Not Blume, 1828.

Asplenium progrediens Fée, Mém. Foug. 8: 81. 1857.

Asplenium campetosorum Mett.; Kuhn, Linnaea 36: 101. 1869.

Asplenium Serra woodwardioideum Moore, Ind. Fil. 167. 1860.

Asplenium Serra Imrayanum Hook. Sp. Fil. 3: 155. 1860.

Rhizome creeping, woody, 5–20 cm. long, 1–2 cm. thick; scales tufted, brown, iridescent, clathrate, lance-attenuate to filiform, up to 15 mm. long. Fronds distichous, erect-spreading, 0.5–1.5 m. long, the stipe stout, rather short, subquadrangular, brown to atropurpureous, deciduously paleaceous; blades oblong-acuminate, 0.4–1.2 m. long, 15–40 cm. broad, pinnate, the rachis like the stipe; pinnae numerous, horizontal or oblique, alternate, subdistant, short-stalked, linear-caudate to lance-attenuate, 8–20 cm. long, 1–3 cm. broad, unequally cuneate at base, the upper side broader, the costae fibrillose-paleaceous beneath; veins oblique, 2–4-forked, glabrescent; margins serrate to triply serrate or incisoserrate; sori 5–20 mm. long, inframedial, sometimes horizontal and confined to a single row close against the costa at either side, or subimbricate distally, or in broader forms diverging at a greater angle and reaching from the costa more than halfway to the margin; indusia firm-membranous. Leaf-tissue coriaceous, dark green and lustrous above.

Tree trunks and rich humus of forested mountain slopes, at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; St. Vincent; Trinidad. Mexico to Brazil and Bolivia; also tropical Africa. Widely variable throughout its range.

8. ***Asplenium laetum*** Sw. Syn. Fil. 79, 271. 1806.

Asplenium drepanophyllum Kunze, Linnaea 9: 66. 1835.

Asplenium Schkuhrianum Presl, Tent. Pter. 107. 1836.

Asplenium lugubre Liebm. Dansk. Vid. Selsk. Skrift. V. 1: 243. 1849.
Asplenium inaequalidens Fée, Mém. Foug. 11: 34. pl. 9, f. 3. 1866.

Rhizome short-creeping, 2–5 mm. thick, the apex closely invested with minute brownish acicular scales. Fronds few, closely distichous, ascending, 20–50 cm. long, the stipes half or two-thirds as long as the blade, brown, sublustrous; blades linear-oblong, 15–35 cm. long, 4–8 cm. broad, acuminate (the tip often attenuate-caudate, up to 6 cm. long, very coarsely serrate), truncate at base, pinnate, the rachis brown, obscurely greenish-marginate; pinnae 18–28 pairs, the lower ones subdistant, opposite, deflexed, the others mostly close, alternate, horizontal, sessile, narrowly trapeziform-oblong, 2–4 cm. long, 6–13 mm. broad at middle, usually rounded-obtuse or acutish at apex, cuneate at the inequilateral base (broadly excavate below about halfway to the apex), the margins elsewhere singly or doubly crenate-serrate; costa oblique, delicate; veins very oblique, the distal mostly forked, the proximal usually simple; sori numerous, narrowly linear, medial; indusia pale, subentire. Leaf-tissue dull green, membranous, the under side deciduously whitish-glandular.

Wet rocks and rocky banks, in forest, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent Grenada; Trinidad; Tobago. Mexico to southern Brazil.

9. *Asplenium obtusifolium* L. Sp. Pl. 1080. 1753.

Asplenium repandulum Kunze, Linnaea 9: 65. 1834.

Asplenium riparium Liebm. Dansk. Vid. Selsk. Skrift. V. 1: 244. 1849.

Rhizome creeping, 2–10 cm. long, 2–5 mm. thick, nearly naked, the exposed apex bearing a few strongly clathrate, brown, deltoid-ovate, acuminate scales. Fronds several, distichous, 5–15 mm. apart, ascending, 10–60 cm. long, succulent, the stipes shorter than the blades, dull olivaceous, naked; blades oblong to deltoid-oblong, simply pinnate, variable, the smaller ones 5–15 cm. long, 4–8 cm. broad, the pinnae (3–7 pairs) alternate, obliquely oblong, rounded-obtuse, and entire, to deltoid-oblong and pinnately parted or deeply lobed at base, lobed or laciniate beyond, the margins sharply erose-dentate; larger blades 15–40 cm. long, 8–20 cm. broad, the pinnae (8–15 pairs) obliquely oblong-lanceolate, often acuminate, up to 11 cm. long and 2.5 cm. broad, strongly auriculate at upper base, widely excavate below, the margins sinuate-dentate to deeply serrate; veins oblique, mostly 1–3-forked; sori linear, lightly arcuate, up to 1 cm. long, inframedial, the indusia narrow. Leaf-tissue dark green, membranous or thin-herbaceous in drying, glabrous.

Wet shaded rocks, often in the spray of waterfalls, at middle elevations, Porto Rico:—Guadeloupe; Dominica; Montserrat; Martinique; St. Lucia; St. Vincent; Grenada; Trinidad; Tobago. Mexico to Bolivia and southern Brazil. Reported from Jamaica and Cuba, probably correctly.

10. *Asplenium integerrimum* Spreng. Nov. Act. Acad. Caes. Leop. Carol. 10: 231. 1821.

Asplenium salicifolium integerrimum Mett. Abh. Senckenb. Ges. Frankfurt 3: 145. 1859.

Rhizome short-creeping, 2–4 cm. long, about 1 cm. thick, the exposed apex bearing a conspicuous tuft of long, filiform, bright brown scales. Fronds 2 or 3, laxly arching, 50–90 cm. long, the stipe half or two-thirds as long as the blade, stout, dull brownish-stramineous; blades ovate-oblong, 30–55 cm. long, 25–30 cm. broad, simply pinnate; pinnae 3–8 pairs and a conform terminal one, subequal, obliquely spreading, distant or subdistant, subopposite to alternate, linear-lanceolate to narrowly oblong-lanceolate, evenly attenuate in the apical half or third, 13–16 cm. long, 2–3 cm. broad; narrowly to broadly cuneate at the subpetiolate base, the upper base wider than the lower and sometimes broadly rounded, the margins perfectly entire throughout, lightly hyaline; costa percurrent, medial; veins very oblique, mostly twice forked; sori about 12 pairs, distant,

slightly inframedial, narrowly linear, 1-2 cm. long, less than 1 mm. broad, the indusia firm, narrow. Leaf-tissue chartaceous, dull green, glabrous, translucent.

Tree trunks, rotten logs, and rich humus of forested slopes, at middle elevations, Porto Rico:—Cuba; Hispaniola; Trinidad. Also southern Mexico.

The Porto Rican plants, listed by Urban as *A. salicifolium* L. and var. *integerrimum*, were subsequently referred to *A. juglandifolium* Lam. on the authority of Hieronymus. Jenman has shown, however, that the latter name, whose basis is wholly Jamaican, applies to *Polybotrya cervina* (L.) Kaulf.

11. ***Asplenium pseudoerectum*** Hieron. Hedwigia 60: 239. 1918.

Rhizome suberect or curved-ascending, 1-5 cm. long, 5-10 mm. thick, the broadly exposed apex clothed with thin, lance-attenuate, dark brown scales. Fronds 4-8, spreading or laxly ascending, 25-60 cm. long, the stipe very short, greenish, evenly greenish-alate; blades linear, 20-50 cm. long, 4-8 cm. broad at middle or just above, long-acuminate (the tip often caudate, 2-6 cm. long, coarsely crenate-serrate), evenly narrowed downward, pinnate, the lower pinnae trapeziform-oblong, about 1 cm. long; rachis dull brownish-stramineous beneath, green above and alate, the wings 0.5-0.8 mm. broad; pinnae 25-40 pairs, horizontal or deflexed, mostly alternate, sessile, the larger ones 2-4 cm. long, trapeziform-oblong or narrowly deltoid from a strongly inequilateral subauriculate base (the distal margin of the base entire and parallel to the rachis, the lower widely excised), acutish to acuminate at apex, the margins beyond the dentate auricle obliquely crenate-lobate, the teeth 1.5-2.5 mm. broad at base, broader than long; veins (auricular ones excepted) oblique, simple; sori 5-12 pairs, linear, 2-4 mm. long, inframedial, distant from the marginal lobes; indusia thin, whitish, 0.5 mm. broad. Leaf-tissue membranous, glabrous, translucent.

Rocks, logs, and the trunks of trees and tree ferns, in wet forests at middle and higher elevations:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Martinique; St. Vincent; Grenada. A closely similar form occurs in Guatemala. The Porto Rican plants were listed by Urban under *A. pteropus* Kaulf., a South American species.

12. ***Asplenium sanguinolentum*** Kunze; Mett. Abh. Senckenb. Ges. Frankfurt 3: 142. pl. 4, f. 10. 1859.

? *Asplenium Feei* Kunze; Fée, Gen. Fil. 194. 1852; Mém. Foug. 7: 49. pl. 15, f. 2. 1857.

Asplenium sarcodes Maxon, Contr. U. S. Nat. Herb. 10: 494. pl. 56, f. 3. 1908.

Asplenium anisophyllum sanguinolentum Hieron. Hedwigia 47: 226. 1908.

Rhizome erect, succulent, 5-10 cm. long, 2-3 cm. thick, the broad exposed apex densely clothed with lance-attenuate brown scales. Fronds numerous (10-15), borne in a perfect crown, suberect, 45-90 cm. long, the stipe about half as long as the blade, stout, dark greenish brown, fibrillose-paleaceous; blades oblong or linear-oblong, 30-60 cm. long, 12-17 cm. broad, subtruncate at base, pinnate, the rachis very narrowly alate and bisulcate ventrally, fibrillose; pinnae 6-14 pairs, obliquely spreading, short-stalked, the lower ones slightly reduced or not, distant, the others subdistant, narrowly oblong-lanceolate, mostly 5-9 cm. long, 1.5-2 cm. broad, evenly attenuate or subcaudate, inequilateral at base (narrowly cuneate or broadly excavate below, obliquely truncate or roundish-subauriculate above), the margins lightly crenate-serrate to biserrate; terminal pinna conform; veins immersed, once or twice forked; sori 6-16 pairs, oblong to elliptic, 3-5 mm. long, about 2 mm. broad, inframedial, distant; indusia broad, firm, greenish at base. Leaf-tissue subcoriaceous, the under side distantly brown-squamulose.

Mountain forest slopes, at middle elevations, Porto Rico:—Cuba; Hispaniola. Mexico to Brazil and Bolivia. The Porto Rican plants were originally reported as *A. anisophyllum* Kunze, a related African species with creeping rhizome.

13. ***Asplenium abscissum*** Willd. Sp. Pl. 5: 321. 1810.

Asplenium firmum Kunze, Bot. Zeit. 3: 283. 1845.

Rhizome erect or curved-ascending, 1-4 cm. long, about 5 mm. thick, ob-

scurely brownish-paleaceous at the small included apex. Fronds few (2-6), cespitose, ascending, 20-40 cm. long, the stipe about equaling the blade, olivaceous to pale brown, very narrowly greenish-marginate above the base; blades narrowly to broadly deltoid-oblong or ovate-oblong, acuminate to abruptly acuminate-caudate, 10-25 cm. long, 5-16 cm. broad, not reduced at base, pinnate, the rachis like the stipe; pinnae few (5-9 pairs), alternate or subopposite, subdistant, slightly ascending, the larger ones (basal two-thirds) sessile or short-stalked, trapezoid-oblong to narrowly oblong-lanceolate, 2.5-8 cm. long, 8-18 mm. broad, acutish to attenuate at apex, inequilateral at base (oblique or exciso-cuneate below, subtruncate above, scarcely auriculate), the margins elsewhere doubly or triply dentate-serrate; terminal pinna confluent, lobate at base, serrate beyond; veins subarcuate, oblique, mostly 1-3-forked; sori distant, up to 9 mm. long, inframedial, reaching more than halfway to the margin; indusia narrow, membranous. Leaf-tissue thin-herbaceous, translucent, glabrate.

Moist forest ravines and rocky slopes, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; St. Eustatius; Guadeloupe; Dominica; Montserrat; Martinique; Grenada; Trinidad. Florida; Mexico to Brazil. Ascribed to St. Thomas by Grisebach.

14. *Asplenium salicifolium* L. Sp. Pl. 1080. 1753.

Asplenium auriculatum Sw. Vet. Akad. Handl. Stockholm 38: 68. 1817.

Asplenium Samanae Brause, Repert. Nov. Sp. Fedde 18: 247. 1922.

Rhizome erect or curved-ascending, the apex clothed with light or yellowish brown, deltoid-lanceolate, attenuate scales. Fronds few, ascending, 25-70 cm. long, the stipes nearly or quite as long as the blades, olivaceous or brownish-stramineous, deeply sulcate anteriorly; blades narrowly to broadly oblong, 15-40 cm. long, 6-22 cm. broad, abruptly acuminate-caudate, truncate at base, simply pinnate, the apical segment subconform or not, usually lobate at base; rachis green, compressed, lightly marginate above; pinnae 10-16 pairs, spreading, subdistant, mostly alternate, straight or subfalcate, short-stalked, lance-attenuate from a strongly unequal base, 3-11 cm. long, 1-2 cm. broad at base, broadly excavate or narrowly cuneate in a straight line below, rounded-auriculate above, the auricle often with a deep proximal sinus and overlying the rachis, crenate-dentate, the margins elsewhere crenate-serrate; veins distant, oblique, mostly twice forked, flabellate in the auricle; sori distant, up to 13 mm. long, very oblique, falling far short of the margin; indusia firm, entire. Leaf-tissue papyraceous to thick-chartaceous, glabrous.

Tree trunks, rotten logs, and rich humus of forested slopes, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad (?). Mexico to Brazil and Bolivia. Small forms are to be compared with *A. hastatum* Kl. and *A. semicordatum* Sw., among other continental species.

15. *Asplenium auritum* Sw. Journ. Bot. Schrad. 1800²: 52. 1801.

Asplenium monodon Liebm. Dansk. Vid. Selsk. Skrift. V. 1: 247. 1849.

Rhizome erect or decumbent, invariably bearing the fibrous remains of old fronds; scales apical, brown, rather soft and thick, incurved, deltoid-oblong, mostly acute, entire. Fronds several, cespitose, suberect or spreading, mostly 20-50 cm. long, the stipe not quite equaling the blade, glabrous, greenish and sulcate anteriorly, commonly fuscous or atropurpureous beneath throughout; blades narrowly to broadly oblong, long-acuminate, truncate at base, mostly 12-30 cm. long, 4-12 cm. broad, pinnate or essentially so, the rachis sometimes dark beneath; pinnae numerous, opposite to alternate, subdistant, commonly sessile, straight, linear or oblong, rounded or acutish at apex, and merely curvessent-serrate beyond the round-auriculate unequal base, or stalked, subfalcate, linear-attenuate or deltoid-linear from an unequal narrowly cuneate base, the oblique narrow auricle often free, the margins beyond variously serrate or serrately incised, or occasionally the whole pinna deeply and obliquely lobed; veins very oblique, mostly forked; sori subdistant, nearly medial; indusia firm,

pointed, whitish. Leaf-tissue chartaceous to spongiose-coriaceous, light green, glabrous.

Tree trunks, rotten logs, and shaded rocky banks, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Martinique; Trinidad. Florida; Mexico southward, throughout South America. Attributed also to tropical Africa and the East Indies.

The description applies mainly to the simpler forms of this species, namely, (1) the typical Jamaica plant, with long-auriculate, attenuate, narrowly cuneate-petiolulate pinnae, which is nearly wanting from the other West Indian Islands but occurs on the Continent from Mexico southward into South America, and (2) the common plant of Porto Rico, Cuba, and Hispaniola, with oblong to linear-oblong, blunt or acutish, broadly cuneate, short-auriculate, sessile or subsessile pinnae, described from Mexico as *A. monodon* Liebm., which extends from Mexico well into South America and occurs also in Trinidad. There are numerous intermediate forms. The Lesser Antilles plants and occasional large specimens from the Greater Antilles have the pinnae rigid and deeply pinnatifid or subpinnate, and are referable to var. *rigida* (Sw.) Hook., an abundant continental form, as currently understood. On the Continent there are numerous other phases, some closely approaching *A. fragrans* Sw. The species as a whole shows extraordinary variation, and the synonymy is correspondingly complicated. The name *A. erosum* L., formerly applied by the writer to the typical Jamaican form of *A. auritum*, belongs properly to another West Indian species.

16. ***Asplenium radicans*** L. Syst. Nat. ed. 10, 2: 1323. 1759.

Asplenium rhizophyllum L. Sp. Pl. ed. 2, 1540. 1763. Not L. 1753.

Asplenium rhizophorum L. Gen. Pl. ed. 6, emendation. 1764.

Asplenium cirrhatum Rich.; Willd. Sp. Pl. 5: 321. 1810.

Asplenium alloopterum Kunze; Klotzsch, Linnaea 20: 353. 1847.

Asplenium cyrtopterum Kunze, Linnaea 23: 233, 303. 1850.

Asplenium mastigophyllum Fée, Mém. Foug. 8: 83. 1857.

Rhizome erect, the apex densely clothed with dark castaneous lance-attenuate scales. Fronds several, cespitose, 25–70 cm. long, ascending and recurved, the stipes rather short, castaneous to purplish brown, highly lustrous; blades linear to lance-oblong, attenuate upward, pinnate, the rachis like the stipe, invariably prolonged as a naked flagellum, gemmiparous at tip and often rooting; pinnae numerous, sessile, the lowermost opposite and deflexed, the others alternate, spreading, in simple forms oblong to oblong-lanceolate, 2–7 cm. long, 7–13 mm. broad, rounded-obtuse to narrowly acuminate at apex, cuneate at lower base, obliquely truncate, and usually low-auriculate at upper, sinuate to crenate-serrate beyond; or (var. *cyrtopterum*) the larger pinnae broader, closely lobate-pinnatifid, deeply so at the rounded auriculate upper base; or (var. *alloopterum*) the pinnae longer, more distantly and deeply pinnatifid, the lobes or segments lance-elliptic to oblong or obovate, rounded-obtuse to acutish, subentire to crenulate-dentate, oblique, narrowly joined, the outer ones small and more broadly long-decurrent, confluent; veins very oblique, pinnate or subflabellate; sori elongate, the indusia firm, narrow. Leaf-tissue dull green, somewhat fleshy, submembranous in drying.

Mountain forests at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Trinidad. Guatemala to southern Brazil.

Highly variable. There are all possible intermediate stages between the forms with subentire and deeply pinnatifid pinnae, the latter listed by Urban as varieties of *A. flabellulatum* Kunze.

17. ***Asplenium uniseriale*** Raddi, Opusc. Sci. Bologn. 3: 291. 1819.

Asplenium rachirhizon Raddi, Pl. Bras. 1: 39. pl. 56. 1825.

Asplenium amabile Liebm. Dansk. Vid. Selsk. Skrift. V. 1: 251. 1849.

Rhizome erect, stout, the apex clothed with long, lanceolate, light brown, finely reticulate scales. Fronds several or numerous, cespitose, ascending and recurved, 0.3–1.3 m. long, the stipe much shorter than the blade, up to 3 mm. thick, dark castaneous to atropurpureous, highly lustrous; blades essentially 3-pinnate, linear-deltoid, 20–80 cm. long, 8–30 cm. broad at base, attenuate at

apex, the rachis like the stipe, greatly elongate, the flagelliform tip naked or bearing a few distant reduced pinnae, gemmiparous and often rooting; pinnae numerous, sessile, the basal ones opposite and deflexed, the others mostly alternate, adjacent to subdistant, spreading or laxly ascending, oblong-acuminate, attenuate at apex or not, 1.5–3.5 cm. broad toward the base; pinnules spreading, lax, rhombic-oblong, narrowly cuneate below, pinnate at base or nearly throughout; segments mostly 5–9 below the obtuse, deeply 2–3-dentate apex, the first distal one the largest, cuneiform, 2–3-lobed at apex, lying parallel to the secondary rachis, the first proximal one distant, reduced, elliptic, entire or emarginate, very oblique, the others intermediate in form, sessile or decurrent and narrowly joined; veins flabellate in the larger segments, simple or once-forked in the smaller; sori linear-oblong, often solitary; indusia pale, membranous. Leaf-tissue membranous-herbaceous, dark green.

Woods near Adjuntas (*Sintenis* 4254) and Utuado (*E. G. Britton* 5221), Porto Rico:—Hispaniola. Mexico to southern Brazil. Listed by Urban as a variety of *A. flabellulatum* Kunze, 1834, a widely distributed tropical American species which exhibits great variation and appears to pass into *A. partitum* (Kl.) C. Chr., according to ample collections from Jamaica, Cuba, and northern South America. The taxonomy is greatly involved.

18. *Asplenium cristatum* Lam. Encycl. 2: 310. 1786.

Asplenium cicutarium Sw. Prodr. 130. 1788.

Rhizome erect, 2–8 cm. long, 5–10 mm. thick; scales dark castaneous, lance-attenuate from a cordate base, rigid. Fronds 10–20, borne closely in a complete crown, suberect, 30–75 cm. long, the stipes short or sometimes nearly equaling the blades, gray-olivaceous to fuscous, narrowly green-marginate anteriorly; blades lanceolate to deltoid-oblong, 20–40 cm. long, 6–16 cm. broad, long-acuminate at apex, acuminate at base or abruptly truncate (with or without 1 or 2 pairs of very short distant pinnae), essentially 3-pinnate; rachis fuscous to brown-olivaceous, widely green-alate anteriorly; pinnae numerous, mostly alternate, close or subdistant, straight or subarcuate, mostly oblong-lanceolate, 3–9 cm. long, 1–2.5 cm. broad, acutish to evenly long-acuminate, sessile, the base usually partly overlying the rachis; pinnules numerous, close, alternate, spreading, obliquely deltoid-oblong to oblong or ovate-oblong, obtuse, coarsely pinnatisect, the first distal division largest, cuneiform and sharply 2–4-fid distally, the others (3–7) narrower, bifid or not, all oblique and narrowly joined, or the pinnules shorter and deeply incised only; veinlets solitary within the ultimate divisions, evident; sori short, elliptical or oval. Leaf-tissue membranous-herbaceous, dark green, glabrous.

Rich moist slopes among rocks or along watercourses in deep forest, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; St. Eustatius; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Lucia; St. Vincent, Grenada; Trinidad; Tobago. Mexico to Brazil and Bolivia. A closely related form occurs in Africa.

19. *Asplenium myriophyllum* (Sw.) Presl, Rel. Haenk. 1: 48. 1825.

Caenopteris myriophylla Sw. Journ. Bot. Schrad. 1800²: 60. 1801; Fl. Ind. Occ. 3: 1626. 1806.

Darea myriophylla Willd. Sp. Pl. 5: 301. 1810.

Asplenium monteverdense Hook. Second Cent. Ferns pl. 41. 1860.

Rhizome erect or decumbent, 1–3 cm. long, 4–8 mm. thick; scales borne in a close apical tuft, narrowly lance-attenuate, brown, dark-sclerotic in the middle. Fronds several or numerous, ascending, 15–40 cm. long, the stipes imbricate-fasciculate, dull brownish, narrowly greenish-alate anteriorly, short, up to 8 cm. long; blades ovate-lanceolate to oblanceolate, 15–30 cm. long, 4–10 cm. broad near the middle, acuminate at apex, attenuate below, 3-pinnate; rachis slender, brownish, strongly green-alate anteriorly; pinnae numerous, alternate, oblique-spreading, sessile or nearly so, the lower ones greatly reduced and distant, the large middle ones close, oblong to ovate-oblong or deltoid-oblong, obtuse or

acutish, 2-5 cm. long, 1-2 cm. broad; pinnules close to subdistant, oblique, mostly stalked, trapezio-ovate, obliquely pinnate, the basal segment stalked, bifid or trifid, the others (2-4) elliptic and entire, with a single central veinlet, to cuneate-obovate and deeply bilobed, mostly subdistant, but narrowly joined; sori solitary, elliptic to linear-oblong; indusia membranous. Leaf-tissue membranous, dark green.

Shaded rocky banks and moist crevices and talus of limestone cliffs, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Bermuda; Hispaniola. Also, Venezuela to Ecuador.

20. **Asplenium cuneatum** Lam. *Encycl.* 2: 309. 1786.

Rhizome erect or decumbent and short-elongate, 2-5 cm. long, about 8 mm. thick; scales numerous, imbricate-ascending, rigid, dark castaneous, reticulate, deltoid-lanceolate. Fronds several, subfasciculate, spreading, 30-60 cm. long, the stipes usually half as long as the blades, fuscous, deciduously fibrillose-paleaceous below; blades oblong-lanceolate to narrowly deltoid-ovate, long-acuminate, 20-40 cm. long, 8-24 cm. broad, essentially 3-pinnate at the truncate base, or at least 2-pinnate throughout, the rachis like the stipe below, brownish-stramineous toward the apex; pinnae numerous, mostly subopposite, spreading, contiguous or subdistant, stalked, elongate-deltoid, 4-13 cm. long, 2-5 cm. broad at base, attenuate-serrate at apex; pinnules oblique or oblique-spreading, strongly anadromous, the larger ones stalked, obliquely ovate-oblong, with 1-3 subpetiolulate segments below the rounded or acutish, obliquely lobed apex; segments in general oblique, obovate-cuneate, 7-10 mm. long, 4-6 mm. broad, the distal margins roundish and deeply dentate-crenate; venation flabellate-pinnate, evident above; sori very oblique, narrowly linear, 2-6 mm. long, often extending to the base of the marginal teeth; indusia firm, pale, very narrow, revolute. Leaf-tissue herbaceous, glabrous, dark green and lustrous above.

Tree trunks and stumps, rarely on the ground, rich forested slopes, mainly at middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Martinique; St. Vincent; Grenada; Trinidad. Also Venezuela. The name has been widely applied to Old World forms, some of which are of close relationship to the West Indian plant.

Asplenium adiantum-nigrum L., a characteristic Old World species, known also from the mountains of Colorado, has been reported from Porto Rico on the basis of a Willdenow specimen, to which, presumably, wrong locality data have been ascribed.

Asplenium rutaceum (Willd.) Mett., founded on illustrations of a Hispaniola plant and not otherwise known from that island, has been ascribed to eastern Porto Rico on the basis of a collection by Schwanecke, which the writer has not seen. The Jamaican plant formerly so referred is *A. conquisitum* Underw. & Maxon.

31. **STRUTHIOPTERIS** Scop. *Fl. Carn.* 168. 1760.

(*LOMARIA* Willd. *Ges. Naturf. Freund. Berlin Mag.* 3: 160. 1809.)

Terrestrial or epiphytic, mainly forest ferns, the rhizomes erect, short-creeping, or scandent, strongly paleaceous. Fronds cespitose or obliquely imbricate in arrangement, not articulate, invariably dimorphous, pinnatisect or 1-pinnate, the sterile ones spreading or ascending, often numerous, the fertile ones few, nearly erect, long-stipitate, with linear, entire, wholly soriferous segments. Sorus elongate-linear, parallel to the midrib, borne just short of the margin upon a continuous thickish receptacle joining the few, short, otherwise free veins running obliquely from the midrib. Indusium intramarginal, facing the costa and at first meeting it, entire to lacerate, often reflexed at maturity, the numerous sporangia covering the under side of the segments. (Greek, meaning ostrich

fern.) About 150 species, mainly of mountainous tropical and subtropical regions.
Type species: *Osmunda Spicant* L.

Sterile blades pinnatisect or nearly so, the segments fully adnate, close; indusia not lacerate with age.

Epiphytic; rhizome high-climbing, the scales with a blackish median line; sterile pinnae not punctate; fertile pinnae not dilatate at base.

1. *S. polypodioides*.

Terrestrial; rhizome suberect, the scales concolorous; sterile pinnae punctate; fertile pinnae dilatate at base.

2. *S. exaltata*.

Sterile blades fully pinnate, the pinnae mostly sessile or subsessile; indusia lacerate with age.

Rhizome scales tufted, acicular, rigidly erect, thick, bicolorous; sterile pinnae coriaceous, yellowish brown, entire.

3. *S. Underwoodiana*.

Rhizome scales laxly imbricate, broad, flat, thin, concolorous; sterile pinnae herbaceous, grayish green, serrulate at apex.

4. *S. lineata*.

1. ***Struthiopteris polypodioides*** (Sw.) Trev. Atti Ist. Ven. III. 14: 571. 1869.

Osmunda polypodioides Sw. Prodr. 127. 1788.

Blechnum onocleoides Sw. Journ. Bot. Schrad. 1800²: 75. 1801.

Lomaria polypodioides Desv. Mém. Soc. Linn. Paris 6: 288. 1827.

Lomaria decrescens Fée, Gen. Fil. 68. 1852; Mém. Foug. 7: 24. pl. 9, f. 1. 1857.

Blechnum polypodioides Kuhn, Fil. Afr. 92. 1868.

Rhizomes ropelike, high-climbing, 5–12 m. long, 1–2 cm. thick, densely imbricate-paleaceous, the scales linear, 10–15 mm. long, dark reddish brown, with a black median line; fronds subapical. Sterile fronds 25–95 cm. long, the stipes much shorter than the blades, bicolorous; blades lance-linear to oblong-lanceolate, 20–80 cm. long, 4–15 cm. broad, pinnatisect, attenuate in both directions, the basal segments greatly reduced, distant, the others contiguous at base; segments 25–75 pairs, mostly alternate and linear-attenuate from a subdilatate base, up to 8 cm. long, 8–12 mm. broad, rigidly herbaceous to coriaceous, naked, entire. Sporophylls 20–70 cm. long, short-stipitate; blades 15–60 cm. long, linear to oblong, abruptly reduced at base; pinnae 22–45 pairs, distant, linear, 3–8 cm. long, 2–3 mm. broad; indusium entire.

Trunks of forest trees at middle to higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Grenada; Trinidad. Also Central America and Panama.

2. ***Struthiopteris exaltata*** (Fée) Broadh. Bull. Torrey Club 39: 264. 1912.

Lomaria exaltata Fée, Mém. Foug. 11: 10. pl. 3. 1866.

Rhizome ascending to rigidly erect, up to 40 cm. long, 1–2 cm. thick, paleaceous, the scales pale brown, lanceolate, about 1 cm. long; fronds rigidly ascending. Sterile fronds few, 30–90 cm. long, the stipes shorter than the blades, bicolorous; blades deltoid-oblong to ovate-lanceolate, 20–50 cm. long, 10–25 cm. broad, subpinnatisect, abruptly reduced at base (commonly with 1–3 contiguous, low or semicircular lobes), gradually narrowed at apex, the terminal segment elongate; segments 9–18 pairs, mostly alternate, distinctly joined, narrowly triangular-oblong, acute, 5–13 cm. long, 1.5–3 cm. broad, falcate or subfalcate, mostly spreading, the margins entire, plane; leaf-tissue rigidly herbaceous, the mostly once-forked veins immersed, ending in rounded hydathodes. Sporophylls 45–90 cm. long, usually exceeding the sterile fronds, the stipes deep reddish brown, concolorous; blades 20–40 cm. long, similar to the sterile in outline, pinnate; pinnae 10–20 pairs, linear, 11–14 cm. long, 3–5 mm. broad, strongly dilatate at base, the wings fertile; indusium entire, not lacerate with age.

Rocky ravines and wet slopes in mountain forests, at higher elevations, Porto Rico:—Cuba; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; Grenada. Also, Costa Rica and Panama.

3. ***Struthiopteris Underwoodiana*** Broadh. Bull. Torrey Club 39: 377. 1912.

Blechnum Ekmanii Brause, Ark. för Bot. 17⁷: 69. 1922.

Rhizome large, erect, densely paleaceous, the scales tufted, rigidly erect, acicular, 2–3.5 cm. long, dark brown, with narrow pale margins. Sterile fronds

85–100 cm. long, the stipes stout, pale brownish, much shorter than the blades; with numerous wartlike vestigial pinnae, deciduously fibrillose-paleaceous; blades oblong or broadly elliptical, 55–70 cm. long, 25–40 cm. broad, abruptly reduced at base, short-acuminate at apex, with an elongate terminal pinna, fully pinnate, the rachis densely clothed with entangled fulvous scales; pinnae 20–30 pairs, alternate, subdistant, linear, mostly 10–20 cm. long, 1.5–2.5 cm. broad, straight or falcate toward the long-acuminate or attenuate tips, the lower ones sessile or short-petiolate from a rounded base, the upper ones semiadnate; leaf-tissue coriaceous, yellowish brown, the veins close and concealed; margins entire, plane. Sporophylls 1 m. long or more, the stipes pale brownish; blades 60–70 cm. long, oblong; pinnae 20–30 pairs, oblique, distant, narrowly linear, 15–30 cm. long, 3–5 mm. broad; indusia brown, deeply and often finely lacerate with age.

On ground and rotting stumps, wet forested slopes at higher elevations, Porto Rico:—Jamaica; Hispaniola.

4. **Struthiopteris lineata** (Sw.) Broadh. Bull. Torrey Club 39: 366. 1912.

Osmunda lineata Sw. Prodr. 127. 1788.

Onoclea lineata Sw. Journ. Bot. Schrad. 1800²: 73. 1801.

Lomaria lineata Willd. Sp. Pl. 5: 290. 1810.

Blechnum lineatum C. Chr. Ind. Fil. 156. 1905.

Rhizome erect, 10 cm. high, thick, densely imbricate-paleaceous, the scales oblong-lanceolate, 1–2 cm. long, light reddish brown, thin, flaccid. Sterile fronds 0.5–1.5 m. long, the stipes usually dark stramineous, as long as the blades, deciduously paleaceous; blades oblong to narrowly lanceolate, 30–75 cm. long, 10–35 cm. broad, pinnate, scarcely reduced at base (without vestigial pinnae), acuminate at apex, with a conform or elongate terminal segment; pinnae 20–40 pairs, alternate, approximate, spreading, linear, 5–20 cm. long, 9–18 mm. broad, falcate, sessile or short-stalked from a cordate base, lightly serrulate or strongly so toward the long-attenuate apex, the costae laxly fulvous-paleaceous; leaf-tissue thick-herbaceous, grayish green, the margins subrevolute; veins close, evident. Sporophylls 0.9–1.5 m. long; blades 25–65 cm. long; pinnae 20–40 pairs, distant, 5–18 cm. long, 3–4 mm. broad, narrowly linear, the caudate tips (5–10 mm.) sterile; indusia irregularly lacerate.

Rocky banks and wet slopes, in partial shade, at higher elevations, Porto Rico:—Jamaica; Cuba. Often dwarfed in exposed situations.

32. **BLECHNUM** L. Sp. Pl. 1077. 1753.

Terrestrial ferns, mainly of open situations, the rhizomes paleaceous, erect and sometimes stout, or wide-creeping and often stoloniferous. Fronds mostly cespitose, small to large, not articulate to the rhizome, the blades simple and entire to once pinnate, the pinnae articulate or not, nearly uniform, the fertile sometimes narrower than the sterile. Veins forked, the branches in sterile pinnae free, parallel, excurrent. Sori elongate-linear, usually continuous, borne near or against the costa upon an elongate transverse veinlet connecting the main veins. Indusia narrowly linear, continuous, facing the costa and at first usually meeting it, thrust back by the mature sporangia, these forming a heavy double line distant from the margin. (Greek, ancient name for a fern.) About 35 species, of wide distribution in both hemispheres. Type species: *Blechnum occidentale* L.

Blades fully pinnate throughout, the pinnae conform, sessile; margins strongly spinulose-serrulate.

Blades pinnate below, the upper segments adnate and confluent below the evenly attenuate apex; margins minutely serrulate.

Blades ovate to oblong-lanceolate; pinnae mostly rounded or cordate at base, the lower ones free, not greatly reduced.

Blades linear, attenuate both ways; pinnae mostly dilatate-adnate, the basal ones greatly reduced.

1. *B. indicum*.

2. *B. occidentale*.

3. *B. unilaterale*.

1. **Blechnum indicum** Burm. Fl. Ind. 231. 1768.

Blechnum serrulatum L. C. Rich. Act. Soc. Hist. Nat. Paris 1: 114. 1792.

Blechnum angustifolium Willd. Sp. Pl. 5: 414. 1810.

Blechnum callophyllum Langsd. & Fisch. Icon. Fil. 20. pl. 23. 1810.

Blechnum stagninum Raddi, Opusc. Sci. Bologn. 3: 294. 1819; Pl. Bras. 1: 54. pl. 62. 1825.

Rhizome widely creeping underground, woody, subterete, 7–10 mm. thick, with erect branches, these densely clothed with small, rigid, dark brown scales. Fronds 2 or 3 together, rigidly erect, 0.5–1.2 m. long, the stipes stout, dull olivaceous from a dark scaly base, shorter than the blades; blades linear to broadly oblong, acutish or abruptly acuminate at apex, mostly 35–70 cm. long, 10–30 cm. broad, pinnate throughout, the apical pinna conform or nearly so; pinnae very numerous, alternate, oblique, subdistant to imbricate, narrowly oblong to ligulate, acute or acutish at apex, 15–18 cm. long, 5–15 mm. broad, inequilateral at base (roundish below), sessile, obliquely articulate, at length deciduous; costae elevated, bearing a few short, broad, yellowish brown, subpersistent scales at either side; veins close, spreading, 1–3-forked; margins cartilaginous, spinulose-serrulate, often irregularly so; leaf-tissue coriaceous, lustrous, glabrous; sori costal, extending in a heavy double line nearly to the tip, usually confined to the apical half of the blade; indusia narrow, concealed at maturity.

Low grassy plains, sunny thickets, and edges of swamps, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Bahamas: Guadeloupe; Dominica; Montserrat; Martinique; Trinidad. Florida; Mexico to southern Brazil. Tropical Asia and Australasia.

2. **Blechnum occidentale** L. Sp. Pl. 1077. 1753 (as *B. orientale* L.).

Rhizome erect or curved-ascending, up to 12 cm. long and 2 cm. thick, ferruginous-paleaceous, stoloniferous. Fronds rigidly ascending, mostly 30–75 cm. long, the stipes of fertile fronds commonly as long as the blades, pale, laxly paleaceous below, usually sulcate; blades ovate to oblong-lanceolate, mostly 20–50 cm. long, 6–25 cm. broad, pinnate at base and often in the basal half, pinnatisect above, the upper segments evenly reduced, narrowly joined, passing gradually into the acuminate or attenuate-subcaudate apex; pinnae numerous, mostly alternate and falcate, linear, evenly attenuate from the middle or from the cordate or subcordate base (8–20 mm. broad), the basal ones usually short-stalked and deflexed, only the upper ones fully adnate; veins close, repeatedly forked; margins scabrous, minutely cartilaginous-serrulate; leaf-tissue herbaceous or subcoriaceous, usually glabrous or nearly so beneath; sori costal, not quite reaching the tip, continuous, the indusia at first light vinaceous and meeting, at length reflexed and overlaid by the sporangia.

Dryish shrubby banks, open situations, and moist forest slopes, at lower and middle elevations, Porto Rico: Tortola; St. Thomas; St. Jan; St. Croix:—Saba; St. Kitts; Antigua; Guadeloupe; Dominica; Montserrat; Martinique; Barbados; St. Lucia; St. Vincent Grenada; Trinidad; Tobago. Florida; Mexico to Argentina.—The names *occidentale* and *orientale*, accidentally transposed in describing the East Indian and West Indian species of *Blechnum* in 1753, were used in their proper sense in the second edition of the Species Plantarum (pp. 1534, 1535. 1763).

3. **Blechnum unilaterale** Sw. Ges. Naturf. Freund. Berlin Mag. 4: 79. pl. 3, f. 1. 1810.

Asplenium blechnoides Lag.; Sw. Syn. Fil. 76. 1806.

Blechnum polypodioides Raddi, Opusc. Sci. Bologn. 3: 294. 1819; Pl. Bras. 1: 53. pl. 60, f. 2. 1825. Not Kuhn, 1868.

Blechnum blechnoides C. Chr. Ind. Fil. 151. 1905. Not Keys. 1873.

Rhizome erect or decurved, up to 5 cm. long, 0.5–1.5 cm. thick, freely stoloniferous, the apex clothed with narrow ferruginous scales. Fronds several, fasciculate, laxly ascending, 20–70 cm. long, the stipes mostly short, pale, bearing a few lax scales; blades linear, tapering about equally in both directions from the middle, or more gradually downward, 15–50 cm. long, 3–9 cm. broad, pinnate

at base, pinuatisect upward, subpinuatisect below the attenuate-caudate serrate apex; basal pinnae distant, irregularly triangular, 2–10 mm. long, broader than long, surcurrent, subauriculate below; succeeding pinnae alternate, subhastate, adnate; middle pinnae narrowly oblong to linear, straight to falcate, 1.5–5 cm. long, 4–7 mm. broad at middle, acute or acuminate, meeting at their dilatate bases, the sinuses acute; veins oblique, subdistant, mostly once forked; margins faintly cartilaginous-scabrous; leaf-tissue thin-herbaceous, glabrous or sometimes puberulous; sori subcostal, usually continuous, the upper line shorter than the lower.

Moist, open or partly shaded, rocky banks, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Martinique. Mexico to southern Brazil.

33. **STENOCHLAENA** J. Smith, Journ. Bot. Hook. 3: 401. 1841; 4: 149. 1841.

Epiphytic ferns of shady situations, the rhizomes woody, scandent, conspicuously paleaceous and unarmed, or nearly naked and sparsely aculeate. Fronds distant, obliquely joined to the rhizome, dimorphous in most species, the sterile ones simply pinnate, the pinnae articulate or not, narrowly elongate, entire to spinulose; veins spreading, simple or forked, arising directly from the costa or from a subcontinuous transverse costal veinlet; small, finely dissected, accessory sterile blades developed in a few Old World species. Fertile fronds similar in structure, the pinnae contracted, completely sporangiferous beneath, simple (or in one species pinnate), non-indusiate, the margins often thin and narrowly recurved. (Greek, alluding to the narrow indusiform margin.) About 40 species, mainly tropical. Type species: *Stenochlaena scandens* J. Sm.

Sterile pinnae inequilateral at base, coriaceous, opaque, the veins immersed, not visible; fertile pinnae 2 mm. broad.

Sterile pinnae equilateral at base, herbaceous, the veins elevated, strongly so beneath; fertile pinnae up to 5 mm. broad.

Rhizome very scantily paleaceous, the scales distant, short, ovate, reddish-brown, denticulate-ciliate.

Rhizome freely paleaceous, the scales loosely appressed-imbriate, long, lance-linear, attenuate, fulvous, freely filamentous-ciliate.

1. *S. amydrophlebia*.

2. *S. Kunzeana*.

3. *S. sorbifolia*.

1. **Stenochlaena amydrophlebia** Slosson; Maxon, Journ. Wash. Acad. Sci. 14: 140. 1924.

Rhizome flat, about 1 cm. broad; scales russet brown, lance-attenuate, 6–9 mm. long, lax, denticulate and bearing a few filament-like gland-tipped teeth. Sterile fronds 70 cm. long, the stipe much shorter than the blade, dull brown; blades lance-oblong, obtuse, 45 cm. long, 14 cm. broad, the rachis strongly alate; pinnae about 16 pairs, oblique, alternate, distant, linear, 6–9 cm. long, 10–13 mm. broad, narrowly cuneate at the unequal base, abruptly short-caudate, oblique, subfalcate, entire or at apex sinuate-dentate, coriaceous, opaque; apical pinna conform; veins deeply immersed, scantily and minutely paleaceous beneath. Fertile fronds 50–60 cm. long; blades lanceolate, 40 cm. long; pinnae alternate, distant, oblique, linear, 2 mm. broad, subpetiolate.

On rocks, in mountain forests, at middle to higher elevations, Porto Rico:—Hispaniola.

2. **Stenochlaena Kunzeana** (Presl) Underw. Bull. Torrey Club 33: 196. 1906.

Olfersia Kunzeana Presl, Tent. Pter. 235. 1836, nomen nudum.

Rhizome 5–10 mm. broad, strongly ridged by the long-adnate stipe-bases, verrucose; scales distant, reddish brown, ovate, long-acuminate, 4–6 mm. long, firm, denticulate-ciliate. Sterile fronds 40–90 cm. long, the stipe very short, light brownish, scantily appressed-paleaceous; blades oblanceolate-oblong,

broadest above the middle, 30–70 cm. long, 8–22 cm. broad, the rachis narrowly alate; pinnae 20–30 pairs, spreading, alternate, distant, linear-attenuate from a subequal, narrowly cuneate, short-stalked base, up to 11 cm. long, 1–1.5 cm. broad, articulate, straight, herbaceous, semitranslucent, erose-denticulate throughout, often sharply and irregularly so; veins prominulous, especially beneath. Fertile fronds similar but smaller, the blades up to 40 cm. long; pinnae distant, long-stalked, 4–5 mm. broad.

On trees and wet limestone rocks, at lower and middle elevations, Porto Rico:—Cuba; Hispaniola. Florida. Juvenile plants, free-creeping in rocky sink-hole regions, have the pinnae deeply and coarsely spinose-serrate, like miniature holly leaves.

3. *Stenochlaena sorbifolia* (L.) J. Smith, Journ. Bot. Hook. 4: 149. 1841.

Acrostichum sorbifolium L. Sp. Pl. 1069. 1753.

Lomaria longifolia Kaulf. Enum. Fil. 153. 1824.

Stenochlaena longifolia J. Smith, Journ. Bot. Hook. 3: 402. 1841.

Rhizome 5–10 mm. thick, obtusely ridged by the arcuate, short-decurrent stipe-bases, lightly verrucose; scales loosely appressed-imbricate, pale to bright fulvous, lance-linear, attenuate, about 1 cm. long, thin, freely filamentous-ciliate. Sterile fronds 50–75 cm. long, the stipes short, paleaceous toward the base; blades oblong, 40–55 cm. long, 12–22 cm. broad, the rachis lightly alate; pinnae 15–20 pairs, slightly ascending, alternate, subdistant, narrowly lance-oblong, long-acuminate or attenuate in the apical third, broadly cuneate at base, sessile or short-stalked, 6–13 cm. long, 1.5–2 cm. broad, articulate, straight, herbaceous, translucent, evenly sinuate-dentate throughout; veins prominulous, especially beneath. Fertile fronds similar but smaller, the pinnae remote, stalked, about 3 mm. broad.

Climbing on trunks of forest trees, at lower and middle elevations, Porto Rico:—Hispaniola; St. Eustatius; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada.

34. **POLYBOTRYA** Humb. & Bonpl.; Willd. Sp. Pl. 5: 99. 1810.

Coarse terrestrial or epiphytic ferns, the rhizome creeping or scandent, conspicuously paleaceous, not jointed to the rhizome. Fronds large, erect or rigidly spreading, long-stipitate. Blades oblong to deltoid, simply pinnate to pinnately decompound, completely dimorphous, the sterile ones mostly coriaceous, the veins pinnately branched (the branches free or obliquely joined in elongate areoles) or once-forked, closely parallel, and united at their apices by a transverse intramarginal vein. Fertile blades greatly contracted, non-foliaceous, the ultimate divisions wholly sporangiferous; indusia wanting. (Greek, alluding to the clustered appearance of the numerous fertile divisions). About 25 species, natives of tropical America. Type species: *Polybotrya osmundacea* Humb. & Bonpl.

1. *Polybotrya cervina* (L.) Kaulf. Enum. Fil. 55. 1824.

Osmunda cervina L. Sp. Pl. 1065. 1753.

Acrostichum cervinum Sw. Syn. Fil. 14. 1806.

Olfersia cervina Kunze, Flora 7¹: 312. 1824.

Rhizome creeping, 1–2 cm. thick; scales very numerous, loosely tufted, narrowly linear, 1–2 cm. long, 1 mm. broad, thin, tortuous, golden to dull ferruginous. Fronds few, contiguous or apart, erect-spreading, 0.5–1.4 m. long, the stout, light brownish stipes subterete, paleaceous below; sterile blades narrowly oblong to oblong-oval, 30–85 cm. long, 20–35 cm. broad, simply pinnate, the pinnae (4–12 pairs) ascending, alternate, mostly stalked, linear-lanceolate to lance-oblong, 15–25 cm. long, 3–7 cm. broad, long-acuminate, unequally cuneate at base (very broadly excavate below), entire, cartilaginous-marginate, light

green, chartaceous or subcoriaceous, glabrous, the terminal pinna conform; veins oblique-spreading, very close, prominulous, mostly forked at base, their apices united by an intramarginal vein. Fertile fronds longer-stipitate; blades nearly 2-pinnate, the pinnae distant, linear, 10–20 cm. long, 1–3 cm. broad; lobes distant, narrowly joined at base, linear-oblong, 2–3 mm. broad, subcylindric, sporangiferous on all sides.

Mountain forests, on wet rocky slopes or occasionally on tree trunks, mainly at middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Saba; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad. Guatemala to Bolivia and Brazil.

35. *LEPTOCHILUS* Kaulf. Enum. Fil. 147. 1824.

Plants terrestrial or epiphytic, the rhizomes relatively slender, woody, creeping or scandent, paleaceous. Fronds not articulate to the rhizome, small to large, dimorphous, the blades simple and entire to once pinnate and pinnatifid, the fertile ones narrow or with narrow divisions. Veins variously anastomosing, the areoles mainly angular, with or without free included veinlets. Sporangia covering the under side of the fertile blades, non-indusiate. (Greek, alluding to the thin straight edges of the fertile blade in the type species.) Species about 60, mostly of the Old World tropics. Type species: *Acrostichum axillare* Sw.

A. Pinnae conform, the terminal one often larger than the lateral ones.

Pinnae mostly stalked, straight, equilateral, thin; ultimate venation prominulous, many of the areoles without free included veinlets.

Pinnae (excepting basal ones) not stalked, subfalcate, inequilateral, pergamentaceous; ultimate venation immersed, most of the areoles with included veinlets.

B. Pinnae gradually smaller toward the apex of the blade, the uppermost confluent.

Areoles with numerous included, simple or branched, pendent veinlets; sterile blades often rooting at tip.

Areoles without included veinlets, or very rarely with a short proximal spur; blades not viviparous.

Terrestrial; blades deltoid.

Scandent; blades narrowly lanceolate to oblong.

1. *L. nicotianaefolius*.

2. *L. pergamentaceus*.

3. *L. cladorrhizans*.

4. *L. alienus*.

5. *L. guianensis*.

1. *Leptochilus nicotianaefolius* (Sw.) C. Chr. Bot. Tidsskr. 26: 285. 1904.

Acrostichum nicotianaefolius Sw. Syn. Fil. 13, 199. 1806.

Acrostichum acuminatum Willd. Sp. Pl. 5: 116. 1810.

Gymnopteris acuminata Presl, Tent. Pter. 244. 1836.

Acrostichum nicotianaefolium saxicolum Jenman, Bull. Bot. Dept. Jamaica II. 5: 153. 1898.

Subepiphytic. Rhizome woody, wide-creeping or climbing, slender, sinuous, brownish-paleaceous, the fronds few, ascending, 1–5 cm. apart. Sterile fronds up to 1 m. long, the stipe usually shorter than the blade, dull olivaceous, distantly divaricate-paleaceous; blades ovate-oblong, long-acuminate, 35–60 cm. long, 25–45 cm. broad, simply pinnate; pinnae 1–4 pairs and a greatly enlarged terminal one, the lateral ones laxly oblique, narrowly pointed-oblong to elliptic-oval, abruptly long-acuminate, 15–25 cm. long, 5–9 cm. broad, equilateral, straight, broadly cuneate or subrotund at base, mostly stalked; lateral veins slightly elevated, falling short of the margin; transverse veins shallowly arcuate; ultimate areoles relatively large, many without free included veins; leaf-tissue membranopapyraceous, the ultimate venation prominulous. Fertile fronds 55–85 cm. long, long-stipitate; pinnae 1–4 pairs and a long terminal one, distant, elliptic-linear, up to 15 cm. long, mostly 1–2 cm. broad.

Climbing at the base of trees and among rocks, in wooded ravines at lower and middle elevations, Porto Rico; St. Thomas:—Jamaica; Hispaniola; Guadeloupe; Martinique; Grenada. Guatemala to Panama.

2. **Leptochilus pergamentaceus** Maxon, Journ. Wash. Acad. Sci. **14**: 144. 1924.

Terrestrial. Rhizome woody, creeping, slender, brown, closely brownish-paleaceous, the fronds few, erect, subdistant. Sterile fronds up to 1 m. long or more, the stipe as long as the blade, stout, stramineous from a darker base; blades broadly ovate-oblong, acuminate, 40–60 cm. long, 25–45 cm. broad, simply pinnate; pinnae 2–5 pairs and a large terminal one, alternate, oblique, ovate, lance-ovate, or broadly oblong, acuminate-caudate, mostly inequilateral and subfalcate, rounded or broadly cuneate at base, the lower ones stalked; lateral veins strongly elevated, nearly reaching the margin; transverse veins deeply arcuate; areoles copiously reticulate, the ultimate meshes numerous, minute, mostly with 1 or 2 free veinlets; leaf-tissue firmly pergamentaceous, the ultimate venation concealed. Fertile fronds up to 1 m. long, long-stipitate; pinnae 2–4 pairs and a terminal one, distant, oblique, lanceolate to narrowly oblong-lanceolate, up to 15 cm. long and 4 cm. broad.

Moist forested slopes and ravine banks, often along streams, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola. Guatemala to Venezuela.

3. **Leptochilus cladorrhizans** (Spreng.) Maxon.

Acrostichum cladorrhizans Spreng. Nov. Act. Acad. Caes. Leop. Carol. **10**: 225. 1821.

Acrostichum portoricense Spreng. op. cit. 226.

Acrostichum alienum flagellum Jenman, Bull. Bot. Dept. Jamaica II. **5**: 154. 1898.

Rhizome creeping, 5–15 mm. thick, appressed-paleaceous, closely nodose. Sterile fronds 0.4–1.4 m. long, close, ascending and often recurved, the stipe stout, somewhat scaly; blades deltoid-oblong, long-acuminate or attenuate, 30–80 cm. long, 20–50 cm. broad, pinnate below; basal pinnae stalked, unequally elongate-deltoid, auriculate-excavate at base, pinnately lobed to pinnatifid on both sides, less deeply toward the acuminate tip; other lower pinnae mostly equilateral, narrowly oblong-lanceolate, attenuate, cuneate to unequally rounded at base, sessile to semiadnate, pinnately lobed; middle and upper pinnae broadly crenate, adnate-decurrent, finally confluent, the tip often flagelliform (up to 50 cm.) and coarsely viviparous at intervals; lobes rounded or acutish (rarely acuminate), serrate; areoles unequal, the larger ones with 1 to several simple or freely branched, included, distal veinlets; leaf-tissue membranous. Fertile fronds up to 1 m. long, long-stalked; blades oblong-ovate, 15–30 cm. long, 8–15 cm. broad; pinnae numerous, mostly linear, acutish or obtuse, the basal ones stalked, usually elongate-deltoid and pinnatifid, the middle sinuate or lobed, the upper subentire and confluent.

Wet shady woods, usually near rocky streams, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Montserrat; Martinique; Grenada; Trinidad; Tobago. Mexico to Colombia.

4. **Leptochilus alienus** (Sw.) C. Chr. Bot. Tidsskr. **26**: 285. 1904.

Acrostichum alienum Sw. Journ. Bot. Schrad. **1800**²: 13. 1801.

Gymnopteris aliena Presl, Tent. Pter. 244. 1836, in part.

Chrysodium maracaybense Karst. Fl. Columb. **1**: 115. pl. 57. 1860.

Heteroneurum alienum Mett.; Kuhn, Bot. Jahrb. Engler **24**: 143. 1897, in part.

Rhizome free-creeping, tortuous, 3–5 mm. thick, laxly brown-paleaceous at apex; fronds few, suberect, apart. Sterile fronds 35–65 cm. long, the stipes about as long as the blades, dull stramineous to pale brown, bearing a few minute deciduous scales; blades deltoid, 15–30 cm. long and broad, pinnate below; basal pinnae short-stalked, lance-linear and attenuate both ways, or (usually) unequally elongate-deltoid in outline, sub-bipartite near the base, the proximal lobe much the shorter, up to 9 cm. long; second pair of pinnae linear-lanceolate,

sessile or short-decurrent; succeeding pinnae shorter, adnate, acutely decurrent, broadly confluent below the crenate-lobate, abruptly long-acuminate apex; margins deeply and coarsely crenate, the crenations subentire; veins dark, joined in regular hexagonal areoles, very rarely with a short proximal included spur; leaf-tissue dark green, membranous-herbaceous. Fertile fronds 45-95 cm. long, long-stipitate; blades elongate-deltoid, 10-30 cm. long, 6-15 cm. broad, pinnate only at base, or with 1-3 pairs of sessile pinnae below the acutely pinnatifid apex, the basal ones usually sub-bipartite; margins entire or coarsely sinuate.

Shady forest ravines, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Trinidad. Venezuela to Bolivia.

5. **Leptochilus guianensis** (Aubl.) C. Chr. Bot. Tidsskr. **26**: 288. 1904.

Polypodium guianense Aubl. Pl. Guian. **2**: 962. 1775.

Acrostichum scandens Raddi, Opusc. Sci. Bologn. **3**: 284. 1819; Pl. Bras. **1**: 6. pl. 18. 1825.

Acrostichum Raddianum Kunze; Hook. Sp. Fil. **5**: 264. 1864.

Gymnopteris guianensis Christ, Bull. Herb. Boiss. II. **1**: 70. 1901.

High-climbing, the rhizome 3-7 mm. thick, woody, sinuous, subangulate, castaneous, sparingly subulate-paleaceous. Fronds 3-7 cm. apart, oblique-spreading, up to 1 m. long, the stipes short, decurrent, dull stramineous, deciduously scurfy-paleaceous; blades oblong to narrowly lanceolate, 25-75 cm. long, 10-20 cm. broad, pinnate nearly throughout, the rachis dull roseous, alate upward; pinnae 10-25 pairs below the short, acuminate, pinnatifid-lobate apex, lance-linear to oblong-lanceolate, 5-11 cm. long, 1-2 cm. broad, the lower ones stalked, all articulate, broadly cuneate at base, serrate or biserrate throughout or from the middle to the tip of the acuminate apex, the costa roseous; veins anastomosing, equal (costules wanting); areoles in 2 or 3 rows, the costal ones largest, the others oblique, elongate-hexagonal, all without included veins; leaf-tissue rigidly herbaceous, glabrous, dull vinaceous before maturity. Fertile fronds much smaller, the pinnae distant, linear, obtuse, 2-5 cm. long, 2-4 mm. broad, densely sporangiate.

Climbing 5 to 10 meters high on tree trunks, in mountain forests at middle and higher elevations, Porto Rico:—Cuba. French Guiana and Brazil.

36. **FADYENIA** Hook. Gen. Fil. pl. 53, B. 1840.

Rhizome short, ascending, minutely paleaceous. Fronds small, cespitose, succulent, simple, costate, strongly dimorphous, the sterile ones mostly prostrate and radicant, the fertile ones rigidly erect, narrower. Veins anastomosing, the areoles elongate, mostly 5- or 6-angled, those of the sterile blades oblique, in several rows, and mostly without included veins; areoles of fertile blades uniseriate, each with a solitary included fertile vein-branch. Sori large, broadly oval in outline, hippocrepiform, terminal, the sporangia radiating from the linear-clavate receptacle. Indusia ample, extrorse, emarginate at base, persistent. (The name commemorates Dr. James MacFadyen, author of The Flora of Jamaica.) A single species, the generic type: *Aspidium proliferum* Hook. & Grev.

1. **Fadyenia Hookeri** (Sweet) Maxon, Contr. U. S. Nat. Herb. **10**: 484. 1908.

Asplenium proliferum Sw. Prodr. 129. 1788. Not Lam. 1786.

Aspidium proliferum Hook. & Grev. Icon. Fil. **1**: pl. 96. 1829. Not R. Br. 1810.

Aspidium Hookeri Sweet, Hort. Brit. ed. 2. 579. 1830. Not Wall. 1829 (nomen nudum).

Polystichum Grevilleum Presl, Tent. Pter. 82. 1836.

Fadyenia prolifera Hook. Gen. Fil. pl. 53, B. 1840.

Aspidium Fadyenii Mett. Fil. Hort. Lips. 95. pl. 23, f. 13, 14. 1856.

Fadyenia Fadyenii C. Chr. Ind. Fil. 319. 1905.

Gregarious. Sterile fronds several, exstipitate, entire, the younger ones obovate to oblanceolate-spatulate, 4–7 cm. long, 1.5–2 cm. broad, the older ones narrowly pointed-elliptic, acuminate or short-attenuate at base, long-attenuate above to the caudate tip, 10–25 cm. long, 1.5–3 cm. broad at middle, prostrate, proliferous and radican at tip, here producing new leafy plants. Fertile fronds ligulate-spatulate, narrowly foliaceous downward, nearly exstipitate, 8–15 cm. long, 5–10 mm. broad; sori 3–6 mm. long; indusium thick, dark, thinly puberulous, ciliolate. Leaf-tissue dark green, glabrate, brittle in drying, the margins laxly and distantly ciliolate.

Dripping rocks and moist earth banks of deeply shaded forest ravines, at middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola.

37. **CYCLOPELTIS** J. Smith in Curtis's Bot. Mag. **72**: Comp. 36. 1846.

Coarse terrestrial ferns, the rhizomes thick and woody, copiously paleaceous. Fronds numerous, fasciculate, suberect, non-articulate, the stipe and rachis deciduously paleaceous; blades uniform, simply pinnate, the pinnae elongate, numerous, subentire, articulate and deciduous; veins free or casually anastomosing. Sori round, dorsal or terminal upon the vein-branches; indusia orbicular, centrally peltate, deciduous. (Greek, alluding to the circular indusia.) Species 5, all but 1 East Indian. Type species: *Aspidium semicordatum* Sw.

1. **Cyclopeltis semicordata** (Sw.) J. Smith in Curtis's Bot. Mag. **72**: Comp. 36. 1846.

Polypodium semicordatum Sw. Prodr. 132. 1788.

Aspidium semicordatum Sw. Journ. Bot. Schrad. **1800**²: 31. 1801.

Polystichum semicordatum Moore, Ind. Fil. lxxxiv. 1857.

Hemicardion Nephrolepis Fée, Gen. Fil. 282. 1852.

Rhizome erect or decumbent, 10–15 cm. long, 1.5–3 cm. thick, the apex densely clothed with tufted, light or yellowish brown, thin, long, linear-attenuate scales. Fronds 0.5–1.2 m. long, close, the stipe short, pale brown, sulcate; blades very narrowly to broadly oblanceolate, 0.4–1 m. long, 12–30 cm. broad, abruptly acuminate, pinnate; pinnae very numerous, spreading, alternate, close or apart, linear-attenuate to oblong-linear and acuminate, entire or lightly undulate, 6–16 cm. long, 1–2 cm. broad, sessile, strongly semicordate-auriculate, the auricle inferior, closely overlying the angulate brownish rachis; upper pinnae evenly reduced, the terminal one usually lobate at base; veins close, spreading, alternately 3–5-forked, 1–3 lower branches soriferous near their base, the sori thus borne in 1–3 close rows on either side of the costa. Leaf-tissue dark green, glabrous, herbaceous in drying.

Moist rocky woods, usually on limestone, at lower and middle elevations, Porto Rico; Mona:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Barbados; St. Vincent; Grenada; Trinidad; Tobago. Southern Mexico to Bolivia.

38. **POLYSTICHUM** Roth, Röm. Arch. Bot. **2**¹: 106. 1799.

Coarse, mainly terrestrial, rigid ferns of rocky forests, the woody rhizomes copiously paleaceous, stout and erect or decumbent, or in a few species ropelike and climbing on tree trunks. Fronds stiffly ascending to recurved, rarely rotate, not articulate; blades uniform or subdimorphous, 1–3-pinnate, often proliferous, more or less paleaceous, the segments usually of harsh texture, mainly auriculate, serrate to spinulose; veins free. Sori round, large, dorsal to subterminal upon the veins; indusia superior, orbicular, centrally peltate, persistent to caducous, or sometimes wanting. (Greek, alluding to the many regular rows of close-set sori in the type species.) About 100 species, mainly of temperate and subtropical regions. Type species: *Polypodium Lonchitis* L.

Rhizome short, erect or ascending; fronds cespitose, the blades 1-2-pinnate.

Fronds rotate, the very long attenuate-caudate apices rooting.

Fronds ascending, not radicant.

Blades simply pinnate, non-proliferous.

Blades 2-pinnate, proliferous below the tip.

Rhizome sarmentose; fronds uniserial, the blades 3-pinnate.

1. *P. rhizophyllum*.

2. *P. triangulum*.

3. *P. polystichiforme*.

4. *P. adiantiforme*.

1. **Polystichum rhizophyllum** (Sw.) Presl, Tent. Pter. 82. 1836.

Polypodium rhizophyllum Sw. Prodr. 132. 1788.

Aspidium rhizophyllum Sw. Journ. Bot. Schrad. 1800²: 31. 1801.

Polystichum Krugii Maxon, Proc. Biol. Soc. Washington 18: 215. 1905.

Rhizome small, densely clothed with firm, ovate-oblong, dull ferruginous scales. Fronds numerous, rotate, 10-25 cm. long, the stipes short (1-5 cm.), slender, pale, deciduously paleaceous; blades 8-20 cm. long, linear to oblong-lanceolate in the lower half, here fully pinnate, 1-2 cm. broad, above evenly attenuate-caudate, the slender tip obtusely lobed at base, subentire above, the apex 1 mm. broad or less, radicant; pinnae 5-15 pairs, spreading, alternate, subdistant, obliquely ovate-oblong to obovate, obtuse, petiolulate, 5-12 mm. long, 3-8 mm. broad, subentire, non-costate, the venation flabellate; both surfaces thinly fibrillose-paleaceous; sori large, mainly confined to the tip and uppermost pinnae; indusia large, caducous.

Rocky banks in partial shade, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola. Attributed also to Guadeloupe.

2. **Polystichum triangulum** (L.) Fée, Gen. Fil. 279. 1852.

Polypodium triangulum L. Sp. Pl. 1088. 1753.

Aspidium triangulum Sw. Journ. Bot. Schrad. 1800²: 31. 1801.

Rhizome curved-ascending, 1-2 cm. thick, densely clothed with dark brown to fuscous, pale-margined scales, the outer ones rigid. Fronds numerous, 30-70 cm. long, the stipes usually much shorter than the blades, pale, deciduously paleaceous at base, fibrillose above; blades variable, lance-linear to narrowly linear, acuminate, 25-45 cm. long, 2-7 cm. broad, simply pinnate, the rachis deciduously fibrillose-paleaceous; pinnae numerous, close or subdistant, mostly alternate, narrowly to broadly rhombic-ovate or rhombic-deltoid, or lance-deltoid from a strongly unequal base, 1-4 cm. long, 1-2 cm. broad, acuminate-aristate, auriculate on one or both sides, serrate (often sharply so), the auricles and larger teeth spinescent or rigidly mucronate; veins close, very oblique, 2-6-forked, impressed; sori borne halfway to the margin in a single row, large; indusia deciduous. Leaf-tissue rigidly coriaceous, laxly rusty-fibrillose beneath.

Forested limestone hill near Florida, Porto Rico:—Jamaica; Cuba; Hispaniola. An extremely variable species, here regarded in the usual sense.

3. **Polystichum polystichiforme** (Fée) Maxon, Contr. U. S. Nat. Herb. 13: 35. 1909.

Phegopteris polystichiformis Fée, Gen. Fil. 247. 1852.

Polystichum tenue Gilbert, Fern Bull. 8: 63. 1900.

Rhizome curved-ascending, 2-4 cm. long, 1-1.5 cm. thick, densely clothed with rather large, thin, brownish, ovate-oblong scales. Fronds several, 40-65 cm. long, the stipes shorter than the blades, slender, dull stramineous, sulcate, the lower part persistently paleaceous like the rhizome; blades deltoid-lanceolate, long-attenuate, 25-40 cm. long, 8-12 cm. broad, 2-pinnate in the main part, simply pinnate in the long tip, the rachis stramineous, deciduously fibrillose-paleaceous; pinnae few, distant, straight or subfalcate, petiolulate, the lower ones largest, these triangular-lanceolate or oblong-acuminate from a broader base, 4-7 cm. long, 1.2-2 cm. broad, the slender rachis persistently fibrillose-paleaceous; segments few, obliquely oblong-ovate or rhombic-oblong, spreading,

the larger ones petiolulate, cuneate at base, laxly short-aristate at apex and along the lightly toothed distal margin; sori few, distant, non-indusiate. Leaf-tissue chartaceous, translucent; veins evident, rusty-fibrillose beneath.

Rich forest slopes, Mt. Torresilla, Porto Rico (*Hioram* 245):—Jamaica; Cuba; Hispaniola.

4. **Polystichum adiantiforme** (Forst.) J. Smith, Hist. Fil. 220. 1875.

Polypodium adiantiforme Forst. Prodr. 82. 1786.

Polypodium coriaceum Sw. Prodr. 133. 1788.

Aspidium coriaceum Sw. Journ. Bot. Schrad. 1800²: 40. 1801.

Aspidium discolor Langsd. & Fisch. Icon. Fil. 16. pl. 18. 1810.

Aspidium capense Willd. Sp. Pl. 5: 267. 1810.

Rumohra aspidioides Raddi, Opusc. Sci. Bologn. 3: 290. pl. 12, f. 1. 1819.

Polystichum coriaceum Schott, Gen. Fil. under pl. 9. 1834.

Rhizome long-creeping, tortuous, flattish, 1.5 cm. broad, densely soft-paleaceous, the large reddish-brown scales imbricate-spreading. Fronds few, 3–10 cm. apart, 0.5–1.5 m. long, the stipe usually shorter than the blade, stout, sulcate, pale, paleaceous at base; blades deltoid, 30–90 cm. long, 25–75 cm. broad, 3-pinnate at base; pinnae few, oblique, rigid, straight, petiolate, the basal ones the largest, these unequally deltoid, long-acuminate, with about 10 pairs of stalked triangular long-acuminate secondary pinnae; upper pinnae oblong-acuminate to lance-deltoid, gradually smaller and simpler; segments lance-elliptic to oblong-ovate from an unequal cuneate base, acutish, the larger ones obliquely incised, the smaller bluntly serrate; veins oblique, immersed; sori very large, slightly inframedial; indusia ample, reddish, caducous. Leaf-tissue very coriaceous, glabrous, or deciduously scurfy beneath.

Tree trunks and rotten logs, at border of forests, middle and higher elevations, Porto Rico:—Jamaica; Cuba; Bermuda; Hispaniola. Widely distributed in South America and the tropics of the Old World. Not uncommon in cultivation.

39. **DRYOPTERIS** Adans. Fam. Pl. 2: 20, 550. 1763.

Small or large, terrestrial, chiefly forest ferns of upright habit, the rhizomes slender, wide-creeping, and nearly naked, to thick, erect, and copiously paleaceous. Fronds borne singly or in a crown, of various habit, usually stipitate, not jointed to the rhizome; blades commonly uniform, 1–3-pinnate or decomposed (rarely simple), glabrous or variously pubescent, in a few species conspicuously paleaceous; veins free, connivent, or regularly areolate. Sori mostly roundish, dorsal, indusiate or not, the indusium if present usually roundish-reniform, fixed at its sinus. (Greek, meaning oak-fern.) Several hundred species, mainly tropical and subtropical. Type species: *Polypodium filixmas* L.

A. Blades simply pinnate, the pinnae entire to very deeply pinnatifid.

1. Veins free and distinct, all excurrent to the margin above the sinus.

a. Middle pinnae 1.5–8 cm. long, 0.5–1.5 cm. broad.

Pinnae opposite; segments close, broadly joined, the basal ones not auriculate.

Pinnae alternate; segments subdistant, narrowly joined, the basal ones often free and auriculate.

Fronds numerous; blades oblanceolate, 3–8 cm. broad; sori medial; indusia very minute, fugacious.

Fronds very few; blades lanceolate, 12–15 cm. broad; sori supramedial; indusia larger, persistent.

b. Middle pinnae 8–45 cm. long, 1.5–4.5 cm. broad.

Veins 4–10 pairs.

Stipes long; lobes broadly oblong, 4–8 mm. long, roundish or truncate, very broadly joined; sori mostly linear.

1. *D. opposita*.

2. *D. sancta*.

3. *D. piedrensis*.

4. *D. Linkiana*.

Stipes very short; segments deltoid-oblong, 10-15 mm. long, acutish, narrowly joined; sori round or oval.

Veins 13-15 pairs.

Segments linear, 8-15 mm. long, acutish; aerophores wanting; veins 13-18 pairs, distant; sori supramedial.

Segments liguliform, 1.5-2.2 cm. long, rounded at apex, subtended by linear brown aerophores; veins 25-50 pairs, very close; sori inframedial.

2. Veins partially connivent to wholly areolate; or the basal ones, if free or barely connivent, meeting at the sinus or sinus membrane, or, if truly joined, the resulting veinlet excurrent to the sinus.

a. Sori round, separate; upper veins, at least, not areolate.

*Rhizome scales glabrous or furnished with simple hairs, the hairs of the blades also simple; indusia large, persistent.

Blades abruptly reduced in basal third to a linear series of auriculiform pinnae; carinate fold below sinuses, extending nearly to costa.

Blades rarely reduced downward, never abruptly so; carinate folds wanting.

† Basal veins of adjacent lobes or segments truly joined, the resulting veinlet excurrent to the sinus.

Rhizome wide-creeping, nearly naked; pinnae stalked, crenate or lobed halfway, the lobes broadly deltoid.

Rhizome erect or decumbent, paleaceous; pinnae sessile, pinnatifid three-fourths the distance to the costa, the segments oblong.

†† Basal veins running to the sinus membrane, not truly joined.

‡ Leaf-tissue papyraceous or thin-herbaceous; distal basal segments usually much enlarged.

Rhizome erect, stout, the fronds fasciculate; scales ovate, glabrous.

Rhizome creeping, slender, the fronds distichous; scales linear, ciliate, hairy.

†† Leaf-tissue coriaceous; basal lobes or segments usually shorter, often greatly reduced.

Pinnae 4-10 mm. broad, pinnately toothed or lobed, the lobes deltoid; veins 7-12 pairs.

Pinnae 2-4 cm. broad, deeply pinnatifid, the segments linear; veins 12-25 pairs.

**Rhizome scales furnished with short-stalked stellate (rarely furcate) hairs, similar hairs borne also upon the rachis and commonly on the minor vascular parts and leaf-tissue; indusia minute, vestigial, or wanting.

† Blades terminating abruptly in a large conform pinna.

Rhizome scales with forked hairs; pinnae 2-6 pairs, subentire to serrate-crenate, pilosulous; lower 2-4 veins meniscoid.

Rhizome scales stellate-pubescent; pinnae 6-12 pairs, lobed or pinnatifid, not pilosulous; only the basal veins united.

Pinnae 6-13 cm. long; veins 6-10 pairs; leaf-tissue pellucid, usually glabrous; sori inframedial, the sporangia setose.

Pinnae 15-28 cm. long; veins 10-16 pairs; leaf-tissue brownish, minutely stellate-puberulous; sori medial, the sporangia glabrous.

†† Blades lacking a large conform terminal pinna. Blades pinnate only at base, the pinnae few, distant, reduced, auriculate.

Blades pinnate in the lower half or two-thirds, at least.

§ Pinnae 1.5-5 cm. long.

Rhizome erect; fronds numerous, rigidly ascending; indusia distinct, elevated.

5. *D. Germaniana*.

6. *D. Sprengelii*.

7. *D. decussata*.

8. *D. deltoidea*.

9. *D. gongylodes*.

10. *D. dentata*.

11. *D. patens*.

12. *D. normalis*.

13. *D. Serra*.

14. *D. oligophylla*.

15. *D. Poiteana*.

16. *D. subtetragona*.

17. *D. megalodus*.

18. *D. domingensis*.

19. *D. sclerophylla*.

- Rhizome decumbent; fronds few, laxly arching or procumbent; indusia vestigial or wanting.
 Blades 10–30 cm. long; pinnae subentire to crenately lobed; sori inframedial. 20. *D. reptans*.
 Blades 35–75 cm. long; pinnae obliquely pinnatifid; sori submarginal. 21. *D. Brittonae*.
 §§Pinnae more than 5 cm. long.
 αSporangia glabrous.
 Pinnae devoid of long simple hairs; indusia evident. 19. *D. sclerophylla*.
 Pinnae sparsely hispid above along the veins and costules, the margins ciliate; indusia minute or wanting.
 Blades 10–20 cm. broad; sori submarginal; indusia wanting. 21. *D. Brittonae*.
 Blades 20–50 cm. broad; sori medial; indusia minute. 22. *D. guadalupensis*.
 ααSporangia setulose or setose.
 Pinnae 4–10 pairs, oblong-linear, broadly crenate, the crenations often truncate; lower veins (2 or 3 pairs) alternately united, or the basal pair meniscoid. 23. *D. hastata*.
 Pinnae 10–17 pairs, linear, deeply lobed, the lobes rounded-acutish; only the basal veins united, the veinlet excurrent to sinus. 24. *D. leptocladia*.
 b. Sori linear-oblong, mostly confluent; all veins joined in regular meniscoid areoles.
 Fronds 20–70 cm. long; pinnae narrowly cuneate at base, ciliate. 25. *D. angustifolia*.
 Fronds 1–2.5 m. long; pinnae broadly and unequally cuneate or rounded at base.
 Pinnae distant, mostly stalked, sharply serrate, the apical teeth often hamate. 26. *D. serrata*.
 Pinnae closer, mostly sessile, the margins entire to lightly crenate. 27. *D. reticulata*.
 B. Blades 2–4-pinnate.
 1. Rhizomes erect or decumbent, conspicuously paleaceous; rachises barbate-paleaceous.
 Scales of costae and costules bullate; blades 7–40 cm. long; segments devoid of spreading whitish hairs.
 Blades deltoid or ovate-deltoid, 3-pinnate at base; basal pinnae deltoid, produced below; indusia small, evanescent. 28. *D. hirta*.
 Blades ovate to oblong-ovate, 2-pinnate-pinnatisect; basal pinnae ovate-oblong, broadest above the base; indusia large, persistent. 29. *D. nemorosa*.
 Scales not bullate; blades mostly 1–2 m. long; segments ciliate and sparsely whitish-hirsute. 30. *D. subincisa*.
 2. Rhizomes creeping, laxly or scantily paleaceous; rachises not paleaceous.
 Blades 15–30 cm. long, 2–3-pinnate, the segments coarse, dark green, deciduously long-hairy beneath; sori very large. 31. *D. chaerophylloides*.
 Blades 0.3–1 m. long, 3–4-pinnate, the segments small, bright green, closely reddish-glandular-pubescent; sori minute. 32. *D. effusa*.
1. ***Dryopteris opposita*** (Vahl) Urban, Symb. Ant. 4: 14. 1903.
Polypodium oppositum Vahl, Eclog. Amer. 3: 53. 1807.
Aspidium conterminum Willd. Sp. Pl. 5: 249. 1810.
Nephrodium conterminum Desv. Mém. Soc. Linn. Paris 6: 255. 1827.
? *Phegopteris adenochrysa* Fée, Gen. Fil. 245. 1852.
Aspidium Rivoirei Fée, Mém. Foug. 11: 76. pl. 21, f. 3. 1866.
Aspidium strigosum Fée, op. cit. 78. pl. 22, f. 2.
Dryopteris contermina Kuntze, Rev. Gen. Pl. 2: 812. 1891.
Nephrodium oppositum Diels in Engl. & Prantl, Pflanzenfam. 14: 172. 1899.
- Rhizome slender, erect, 5–15 cm. long, 1–1.5 cm. thick, the apex bearing a few thin brownish lanceolate scales. Fronds numerous, rigidly ascending in a

close crown of shuttlecock habit, 25–110 cm. long; stipe very short or wanting; blades lance-linear to linear-oblong, 5–15 cm. broad, pinnate, acuminate at apex, evenly long-attenuate from the middle downward, with many pairs of small pinnae, the lowest minute; stipe stramineous, thinly and laxly puberulous; pinnae opposite, mostly close, horizontal, sessile from a subhastate base, the middle ones 2.5–8 cm. long, 5–15 mm. broad at base, tapering thence to the acute or attenuate, subentire apex, coarsely pinnatifid more than halfway to elevated costa, the segments slightly oblique, oblong to deltoid-ovate, obtuse, usually with open acute sinuses, the margins entire, ciliolate, revolute or not; veins 5–7 pairs, simple; sori medial; indusia small, strongly glandular. Leaf-tissue thin-herbaceous, glabrate above, obscurely pilosulous and freely resinous-glandular beneath.

Rugged mountain slopes and ravines, often along streams in partial shade, at middle to higher elevations, Porto Rico:—St. Kitts; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad; Tobago. Northern South America.

2. *Dryopteris sancta* (L.) Kuntze, Rev. Gen. Pl. 2: 813. 1891.

Acrostichum sanctum L. Syst. Nat. ed. 10, 2: 1320. 1759.

Polypodium sanctum Sw. Prodr. 133. 1788.

Polypodium Balbisii Spreng. Nov. Act. Acad. Caes. Leop. Carol. 10: 228. 1821.

Phegopteris sancta Fée, Gen. Fil. 243. 1852.

Phegopteris tenella Fée, loc. cit.

Nephrodium sanctum Baker in Hook. & Baker, Syn. Fil. 267. 1867.

Rhizome erect or decumbent, up to 10 cm. long and 1.5 cm. thick, with a mass of coarse fibrous roots. Fronds numerous, tufted, erect-arching, mostly 15–40 cm. long, short-stipitate, both stipe and rachis stramineous, slender; blades oblanceolate, up to 35 cm. long, 3–8 cm. broad, pinnate, attenuate at apex, long-attenuate at base, the lower pinnae (several pairs) evenly reduced, distant, auriculate, unequally 3-foliolate; larger pinnae up to 5 cm. long, 5–12 mm. broad, narrowly triangular-lanceolate, sessile, inequilateral or not at base, very deeply pinnatifid, often glandular beneath, the costae, costules, veins, and herbaceous leaf-tissue glabrous to finely hirtellous on both sides, sometimes resinous-glandular beneath; segments distant, oblique, mostly linear-oblong, roundish at apex, narrowly joined, entire or lightly crenate-serrate, or the basal pair (one or both) free, semihastate or strongly biauriculate; veins 5–10 pairs, oblique, distant, elevated, the lower ones forked; sori small, medial; indusium very minute, resinous-glandular, ciliolate, fugacious.

On rocky banks in partial shade, usually along streams and forest trails, at lower to higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe (?); Dominica. Also in Guatemala. Here belongs *Sintenis 1753* in part, previously referred with doubt to *D. consanguinea* (Fée) C. Chr., a Lesser Antilles species not reported otherwise from Porto Rico.

3. *Dryopteris piedrensis* C. Chr. Smiths. Misc. Coll. 52: 372. 1909.

Rhizome erect, 5–12 cm. long, 1.5–2.5 cm. thick, the apex clothed with numerous lance-attenuate, glossy, brown scales. Fronds few, fasciculate, ascending, 35–70 cm. long, the stipes short, slender, stramineous, angulate, thinly short-puberulous; blades lanceolate, 25–55 cm. long, 12–15 cm. broad, pinnate, attenuate in both directions, the rachis slender, short-puberulous; pinnae alternate, distant, horizontal, sessile, the 2–5 lower pairs gradually reduced, the basal ones remote, auriculiform, hastate; middle pinnae narrowly oblong-lanceolate, 6–7.5 cm. long, 1–1.5 cm. broad, evenly attenuate beyond the middle, deeply and obliquely pinnatifid to the serrate tip, above minutely scabrid-setulose in all parts, beneath distinctly resinous-glandular, minutely puberulous on the costae, costules, and veins, obscurely so on the herbaceous leaf-tissue; segments subdistant, linear-oblong, acutish, entire or lightly crenate, about 2 mm. broad at the decurrent base, narrowly joined or the basal pair free (the proximal one auricu-

late); veins 7-9 pairs, simple, distant, oblique, strongly elevated on both sides; sori small, supramedial, borne against the strongly revolute margin; indusia small, coarsely glandular, ciliate.

Moist shady banks, at higher elevations, Porto Rico:—Eastern Cuba.

4. **Dryopteris Linkiana** (Presl) Maxon, Journ. Wash. Acad. Sci. **14**: 199. 1924.

Gymnogramme diplazoides Desv. Mém. Soc. Linn. Paris **6**: 214. 1827.

Gymnogramme polypodioides Link, Hort. Berol. **2**: 50. 1833. Not Spreng. 1827.

Grammitis Linkiana Presl, Tent. Pter. 209. 1836.

Gymnogramme Linkiana Kunze, Linnaea **18**: 310. 1844.

Phegopteris Duchassaingiana Fée, Mém. Foug. **11**: 57. pl. 14, f. 3. 1866.

Dryopteris diplazoides Urban, Symb. Ant. **4**: 21. 1903. Not Kuntze, 1891.

Nephrodium Linkianum Diels in Engl. & Prantl, Pflanzenfam. **14**: 172. 1899.

Rhizome erect, slender, 10-15 cm. long, 1-1.5 cm. thick, freely clothed with rigid, lance-attenuate, dark brown, pubescent scales. Fronds several, erect, up to 1.4 m. high, the stipe relatively long, stout, pale brown, deeply angular-sulcate, lustrous, minutely puberulous; blades lanceolate, 0.5-1 m. long, 15-25 cm. broad, pinnate, attenuate at apex, abruptly but evenly narrowed at base, the 3-6 lowermost pinnae distant, greatly reduced; main pinnae numerous, horizontal, sub-distant, narrowly deltoid-oblong, long-acuminate, 8-13 cm. long, 1.5-2.5 cm. broad at base, sessile, pinnatifid about halfway to the costa; lobes broadly oblong, 4-8 mm. long, roundish or truncate, 4-6 mm. broad at base (the sinuses narrow, acute), entire, above minutely strigillose throughout, beneath thinly strigose along the costule, the thin-herbaceous leaf-tissue obscurely hirtellous, glabrescent; veins 4-8 pairs, simple, oblique; sori mostly linear, non-indusiate.

Not seen. Ascribed to Porto Rico on the basis of *Sinten's* 6445, reported by Christensen as *D. diplazoides* (Desv.) Urban. Other specimens so listed by Urban pertain partly to *D. Germaniana* (Fée) C. Chr.:—Hispaniola; Guadeloupe; Martinique. Mexico to Brazil and Bolivia.

5. **Dryopteris Germaniana** (Fée) C. Chr. Ind. Fil. 267. 1905.

Phegopteris Germaniana Fée, Mém. Foug. **11**: 55. pl. 13, f. 2. 1866.

Polypodium Germanianum Baker in Hook. & Baker, Syn. Fil. 306. 1867.

Rhizome suberect, 10-15 cm. long, 2 cm. thick, the apex clothed with large, thin, pale brown, hairy scales. Fronds several, erect-arching, up to 1.2 m. long, the stipe very short, stout, brownish, deeply 3-sulcate, pilosulous, scurfy-paleaceous; blades lance-ovate, 0.5-1 m. long, 20-35 cm. broad, pinnate, attenuate at apex, abruptly reduced below, with about 10 pairs of distant auriculiform basal pinnae (2-15 mm. long), the rachis brownish; main pinnae numerous, spreading, distant, narrowly oblong-acuminate or evenly attenuate from the middle, 10-25 cm. long, 2-3 cm. broad, sessile, pinnatifid to 2-3 mm. from the costa; segments deltoid-oblong, 1-1.5 cm. long, distally acutish, 5-7 mm. broad at base (the sinuses open, acutish), entire, above evenly strigillose throughout, beneath (including the membranous leaf-tissue) minutely pilosulous; veins 7-10 pairs, simple, oblique, delicate; sori nearly medial, round or oval; indusium small, hyaline, ciliate, caducous, or apparently sometimes wanting.

Mountain forests and coffee plantations, at middle and higher elevations, Porto Rico:—Cuba; Hispaniola; Guadeloupe; Martinique. Here belong most of the Porto Rican specimens previously listed as *Dryopteris diplazoides* (Desv.) Urban, two of which have been referred also (probably in error) to *D. consimilis* (Fée) C. Chr. and *D. heteroclita* (Desv.) C. Chr.

6. **Dryopteris Sprengelii** (Kaulf.) Kuntze, Rev. Gen. Pl. **2**: 813. 1891.

Aspidium Sprengelii Kaulf. Flora **6**: 365. 1823.

Lastrea Sprengelii Presl, Tent. Pter. 75. 1836.

Nephrodium Sprengelii Hook. Sp. Fil. **4**: 94. 1862.

Aspidium Berteroanum Fée, Mém. Foug. 11: 77. pl. 21, f. 3. 1866.

Dryopteris Balbisii Urban, Symb. Ant. 4: 14. 1903. Not *Polypodium Balbisii* Spreng. 1821.

Rhizome erect, 6–12 cm. long, 1.5–2 cm. thick, the apex clothed with glossy brown lance-attenuate scales. Fronds several, closely fasciculate, ascending, 0.6–1.4 m. long, the stipe very short, stramineous, sulcate, scaly at base; blades oblong to linear-lanceolate, 0.5–1.1 m. long, 20–40 cm. broad, pinnate, acuminate at apex, abruptly attenuate at base, the basal pinnae (4–6 pairs) distant, greatly reduced; rachis stramineous, glabrate; pinnae numerous, close, horizontal, oblong-lanceolate, attenuate, 10–20 cm. long, 1.5–3 cm. broad, deeply pinnatifid, the costa strigillose above, thinly pilosulous beneath or glabrate; segments close, patent, linear, acutish, entire, membranous, sparsely and deciduously strigillose above, freely glandular beneath and glabrate to thinly short-puberulous along the costule and the simple distant veins (13–18 pairs); sori slightly supramedial, partly concealed by the revolute margin; indusia small, persistent, glandular.

Ravines and moist rocky banks in partial shade, at middle to higher elevations, Porto Rico; St. Thomas;—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Lucia; St. Vincent; Grenada; Trinidad; Tobago. Mexico to northern South America.

7. *Dryopteris decussata* (L.) Urban, Symb. Ant. 4: 19. 1903.

Polypodium decussatum L. Sp. Pl. 1093. 1753.

Polypodium grammicum Spreng, Neu. Entd. 3: 6. 1822.

Glaphyopteris decussata Presl, Abh. Böhm. Ges. Wiss. V. 5: 344. 1848.

Gymnogramme microcarpon Fée, Mém. Foug. 7: 43. pl. 20, f. 5. 1857.

Nephrodium decussatum Diels in Engl. & Prantl, Pflanzenfam. 14: 171. 1899.

Rhizome stout, decumbent. Fronds few, close, ascending, up to 3.5 m. long; stipe up to 1.2 m. long, stout, terete, purplish brown, minutely glandular-puberulous and bearing few or many large, appressed, thin, brownish scales; blades oblong, abruptly acuminate, 1–2.3 m. long, 50–90 cm. broad, pinnate, the rachis stout, brownish; pinnae horizontal, sessile, ligulate, 25–45 cm. long, 3–4.5 cm. broad, attenuate or abruptly acuminate-caudate, subpinnatisect, the costa stout, densely hirsute above, glandular and sparsely hirsute beneath, subtended by a stout horny aerophore, the limb acicular, up to 1 cm. long; segments liguliform, 1.5–2.2 cm. long, 3–4 mm. broad, obliquely rounded at apex, close, narrowly joined (the sinuses linear), entire, laxly long-ciliate, the costule sparsely hispid above, glandular and pubescent beneath, subtended by deciduous, linear, brown aerophores (2–3 mm. long); veins 25–50 pairs, simple, very close, prominulous; sori in a dense inframedial line; indusia minute, ciliate, early deciduous. Leaf-tissue membrano-herbaceous, deciduously glandular beneath.

Shady banks and moist forest borders, at middle and higher elevations, Porto Rico;—Jamaica; Cuba; Hispaniola; St. Kitts (?); Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad. Costa Rica to northern South America.

8. *Dryopteris deltoidea* (Sw.) Kuntze, Rev. Gen. Pl. 2: 812. 1891.

Polypodium deltoideum Sw. Prodr. 133. 1788.

Aspidium deltoideum Sw. Journ. Bot. Schrad. 1800: 34. 1801.

Polypodium appendiculatum Poir. in Lam. Encycl. 5: 533. 1804. Not Sw. 1806.

Nephrodium deltoideum Desv. Mém. Soc. Linn. Paris 6: 259. 1827.

Lastrea deltoidea Moore, Ind. Fil. 89. 1858.

Rhizome creeping, slender, wiry, ridged, rough with old stipe-bases; scales numerous, dark castaneous, linear-attenuate, up to 1.5 cm. long. Fronds several, erect, 30–80 cm. long, short-stipitate; blades 25–65 cm. long, pinnate, very abruptly reduced in the basal third or half to a linear series of short reflexed auriculiform pinnae (7–15 mm. long), the expanded apical portion deltoid to

oblong, 20–40 cm. long, 12–25 cm. broad, abruptly acuminate-attenuate at apex, the tip pinnatifid-lobate; rachis and stipe stout, sulcate anteriorly, densely short-puberulous and grayish-hirsute; major pinnae spreading, close to subdistant, narrowly oblong, acute or acuminate, broadest at the truncate base, mostly sessile, obliquely lobed more than halfway to the stout costa, the segments subfalcate, broadly oblong, 4–6 mm. broad, obliquely rounded (acutish distally), entire, very close, a cartilaginous membrane running from sinus to costa; veins 8–12 pairs, simple, arcuate, close, broadly elevated, the basal pair running to the sinus, both the veins and costules strigose-setulose beneath; sori supramedial; indusia small, dark brown, short-pubescent, withering. Leaf-tissue grayish-green, subcoriaceous, glabrous.

Moist forest slopes, at middle and higher elevations, Porto Rico; St. Thomas:—Jamaica; Cuba. Reported from Trinidad.

9. *Dryopteris gongylodes* (Schkuhr) Kuntze, Rev. Gen. Pl. 2: 811. 1891.

Aspidium goggilodus Schkuhr, Krypt. Gewächs. 1: 193. pl. 33c. 1809.

Nephrodium unitum R. Br. Prodr. Fl. Nov. Holl. 148. 1810. Not *Polypodium unitum* L. 1759.

Aspidium Pohlianum Presl, Delic. Prag. 1: 173. 1822.

Nephrodium gongylodes Schott, Gen. Fil. under pl. 10. 1834.

Nephrodium paludosum Liebm. Dansk. Vid. Selsk. Skrift. V. 1: 275. 1849.

Goniopteris cheilocarpa Fée, Gen. Fil. 251. 1852.

Rhizome wide-creeping, freely branched, terete, 2–5 mm. thick, nearly naked. Fronds distant, erect, 0.5–2 m. long, the stipes as long as the blades, usually light brown from a darker base, polished, naked, glabrous; blades linear to oblong, short-acuminate, up to 1 m. long and 45 cm. broad, usually much smaller, pinnate, the upper pinnae gradually reduced, the rachis brown to stramineous; pinnae numerous, spreading or oblique, distant, linear-attenuate, mostly 10–25 cm. long, 5–15 mm. broad, stalked, deeply crenate-dentate or lobed halfway to the elevated costa, glabrous above, the costae and costules usually capitate-glandular and laxly paleaceous beneath, glabrous or sometimes pilosulous, the hairs extending to the veins and leaf tissue; lobes deltoid, acute or rounded-obtuse, the sinuses short, open, acutish; veins 8–15 pairs, the basal pair broadly united, the veinlet long-excurrent to the sinus; sori numerous, close, nearly medial; indusia persistent, glabrous or puberulous. Leaf-tissue light to dark green, papyraceous to thick-herbaceous according to habitat.

Swamps and marshy stream banks, at lower and middle elevations, Porto Rico; rare: —Jamaica; Cuba; Hispaniola; Guadeloupe; Martinique. Florida to Argentina. Tropical and subtropical regions of the Old World.

10. *Dryopteris dentata* (Forsk.) C. Chr. Dansk. Vidensk. Skrift. VIII. Naturv. Afd. 6: 24. 1920.

Polypodium dentatum Forsk. Fl. Aegypt. 187. 1775.

Polypodium molle Jacq. Coll. Bot. 3: 188. 1789. Not Schreb. 1771.

Aspidium violascens Link, Hort. Berol. 2: 115. 1833.

Dryopteris parasitica Kuntze, Rev. Gen. Pl. 2: 811. 1891. Not *Polypodium parasiticum* L. 1753.

Dryopteris mollis Hieron. Hedwigia 46: 348. 1907.

Rhizome erect or decumbent, 2–10 cm. long, the apex clothed with lance-attenuate, ciliolate, short-pubescent, brownish scales. Fronds fasciculate, ascending, 0.3–1.2 m. long, the stipes shorter than the blades, dark stramineous; blades lanceolate or oblanceolate to oblong or oblong-ovate, usually narrowed at base, acuminate at apex (the tip pinnatifid-lobate), 25–80 cm. long, 12–25 cm. broad, pinnate, the rachis persistently pilose; pinnae sessile, narrowly oblong to linear-acuminate, horizontal (or the reduced lower ones distant, auriculate and deflexed), pinnatifid about three-fourths the distance to the costa; segments papyraceous, close, straight or nearly so, oblong, 4–9 mm. long, 3–4 mm. broad,

rounded-obtuse or acutish, entire or crenulate (the distal basal ones larger, often lobed), ciliolate, thinly hirtellous above, everywhere short-pilosulous and minutely glandular beneath; veins 6-10 pairs, simple, the basal pair usually united, the veinlet running to the sharp sinus; sori medial; indusia short-pilosulous, persistent.

Moist shady banks and brushy slopes, at lower to higher elevations, Porto Rico; Tortola; St. Thomas; St. Jan; St. Croix:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Montserrat; Martinique; St. Lucia; St. Vincent; Grenada; Trinidad; Tobago. Southern United States to Argentina; Africa.

11. **Dryopteris patens** (Sw.) Kuntze, Rev. Gen. Pl. 2: 813. 1891.

Polypodium patens Sw. Prodr. 133. 1788.

Aspidium patens Sw. Journ. Bot. Schrad. 1800²: 34. 1801.

Polypodium arcuatum Poir. in Lam. Encycl. 5: 528. 1804.

Aspidium stipulare Willd. Sp. Pl. 5: 239. 1810.

Aspidium macrourum Kaulf. Flora 6: 365. 1823.

Nephrodium albescens Desv. Mém. Soc. Linn. Paris 6: 258. 1827.

Dryopteris stipularis Maxon, Bull. Torrey Club 33: 198. 1906.

Rhizome erect, stout, up to 15 cm. long and 4 cm. thick, the apex clothed with large, ovate, pale brown, glabrous scales. Fronds several, fasciculate, 0.7-2 m. long, erect, the stipe straight, shorter than the blade, stramineous, quadrangular, deciduously pubescent, scaly at base; blade oblong, abruptly short-acuminate, 45-120 cm. long, 20-45 cm. broad, pinnate, the rachis stout; pinnae numerous, spreading, usually adjacent, linear-attenuate, 10-25 cm. long, 1-3 cm. broad, the lower ones slightly shorter and reflexed, all broadest at base, obliquely pinnatifid to 1-2 mm. from the stramineous costa, the whole under side (including the leaf surface) minutely glandular and whitish-pilosulous; segments oblong to linear-oblong, close, usually falcate, acutish, the basal pair large and often pinnately incised; veins 8-15 pairs, simple, prominulous, the basal ones arcuate, running to a short cartilaginous membrane just below the acute sinus; sori slightly supramedial, numerous, close; indusia pale brown, whitish-pilose, persistent. Leaf-tissue papyraceous to thin-herbaceous.

Forest borders and moist, half-open situations along roadsides and ravines, Porto Rico; St. Thomas; St. Croix:—Jamaica; Cuba; Bermuda; Hispaniola; Guadeloupe; Dominica; Montserrat; Martinique; Barbados; St. Vincent; Grenada; Saba; Trinidad. Florida; Mexico to Argentina and Chile.

12. **Dryopteris normalis** C. Chr. Ark. för Bot. 9¹¹: 31. 1910.

Nephrodium patens Jenman, Bull. Bot. Dept. Jamaica, II. 3: 165. 1896.
Not Desv. 1827.

Rhizome horizontal, creeping, woody, 5-10 mm. thick, often tortuous, laxly clothed with linear-attenuate, lustrous, castaneous, ciliate, hairy scales. Fronds several, distichous, suberect, 0.5-1.3 m. long, the stipe stramineous from a dark arcuate base, often as long as the blade, deciduously puberulous; blades lance-oblong to broadly ovate-oblong, abruptly short-acuminate, 25-80 cm. long, 10-35 cm. broad, pinnate, the rachis scantily puberulous; pinnae numerous, distant, linear-attenuate, the lowest often deflexed, not reduced, all obliquely pinnatifid as in *D. patens*, the segments straight or subfalcate (the basal ones largest but not often lobed), ciliate, the costules and veins obliquely hirtellous above, glandular and whitish-pilosulous beneath, shorter hairs and sessile glands extending to the leaf-surfaces; veins 8-10 pairs, prominulous or not, the basal pair meeting at the hyaline sinus membrane; sori medial, close; indusia persistent, pilosulous. Leaf-tissue papyraceous or thin-herbaceous.

Rocky slopes, gullies, and roadsides, in open or partially shaded situations, at lower and middle elevations, Porto Rico; Tortola:—Jamaica; Cuba; Bahamas; Bermuda; Hispaniola. Southeastern United States.

13. **Dryopteris Serra** (Sw.) Kuntze, Rev. Gen. Pl. 2: 813. 1891.

Polypodium Serra Sw. Prodr. 132. 1788.

Aspidium Serra Sw. Journ. Bot. Schrad. 1800²: 33. 1801.

Nephrodium Serra Desv. Mém. Soc. Linn. Paris 6: 253. 1827.

Gregarious; rhizome free-creeping, woody, smooth, the exposed apex clothed with numerous thin, lax, linear, ciliate, hairy, castaneous scales. Fronds several, apart, erect, up to 2.2 m. long, the stipe dull or yellowish-stramineous from a dark, thick, arcuate base, equaling the blade or not, deeply sulcate anteriorly, glabrate; blades broadly oblong, up to 1 m. long and 50 cm. broad, pinnate, with a conform or enlarged terminal pinna, the rachis stout, densely but deciduously short-puberulous; pinnae numerous, oblique, distant, sessile, narrowly linear-attenuate, up to 30 cm. long, 4–10 mm. broad, pinnately lobed or toothed, the costa stout, stramineous, bearing a few lax, linear, ciliate scales and (together with the costules, veins, and leaf-tissue) freely short-hirtellous beneath; teeth deltoid, revolute, sharply acute, or the lower ones shorter and broader; veins 7–12 pairs, thick, stramineous, elevated on both sides, the 2–4 lower pairs connivent to the linear sinus callus; sori medial, close; indusia large, reddish brown, firm, persistent, setulose. Leaf-tissue coriaceous, light green, glabrous above.

Moist rocky banks in scant shade, at middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola. The St. Thomas record presumably pertains to *D. oligophylla* Maxon.

14. **Dryopteris oligophylla** Maxon, Contr. U. S. Nat. Herb. 10: 489. 1908.

Polypodium invisum Sw. Prodr. 133. 1788.

Aspidium invisum Sw. Journ. Bot. Schrad. 1800²: 34. 1801.

Nephrodium Sloanei Baker in Hook. & Baker, Syn. Fil. ed. 2, 263. 1874.

Not Presl, 1825.

Dryopteris Sloanei Kuntze, Rev. Gen. Pl. 2: 813. 1891.

Dryopteris Serra incisa Urban, Symb. Ant. 4: 17. 1903.

Rhizome horizontal, terete, tortuous, 1 cm. thick, the tip densely scurfy with thin, dark brown, setulose-ciliolate scales. Fronds few, apart, erect-arching, rigid, up to 3 m. long, the stipes as long as the blades, stout, stramineous from a brownish arcuate base, glabrescent; blades oblong, up to 1.5 m. long and 90 cm. broad, pinnate, the upper pinnae gradually reduced; rachis stout, stramineous, minutely puberulous; pinnae numerous, distant, linear-attenuate, 25–45 cm. long, 2–4 cm. broad, deeply pinnatifid, the basal or several lower pairs attenuate at base and short-stalked, the upper ones broadest at base, sessile; costae prominent, obscurely fibrillose-scaly beneath, short-puberulous or glabrate; segments oblique, subfalcate, linear, acute, entire, 3–5 mm. broad at base (the sinuses open but acute), the lower pinnae with distal basal segments reduced and 2–4 proximal ones vestigial or wanting; veins 12–25 pairs, close, oblique, elevated, falcate, minutely setulose beneath; sori numerous, small, medial; indusia large, firm, pale reddish, glabrous or thinly setulose. Leaf-tissue coriaceous.

Forest borders and half-open slopes, at lower to higher elevations, Porto Rico; St. Thomas:—Jamaica; Cuba; Hispaniola; St. Kitts. Several varietal forms occur on the continent from Mexico to Bolivia.

15. **Dryopteris Poiteana** (Bory) Urban, Symb. Ant. 4: 20. 1903.

Polypodium crenatum Sw. Prodr. 132. 1788. Not Forsk. 1775.

Lastrea Poiteana Bory, Dict. Class. 9: 233. 1826.

Goniopteris crenata Presl, Tent. Pter. 183. 1836.

Goniopteris Rivoirei Fée, Gen. Fil. 253. 1852.

Phegopteris crenata Mett. Fil. Hort. Lips. 84. 1856.

Rhizome short-creeping, 1 cm. thick or less, bearing a few castaneous furcate-pubescent scales at apex. Fronds few, close, 0.5–1 m. long, suberect, the fertile ones usually long-stipitate; stipes pale, subquadrangular, glabrescent; blades oval to broadly deltoid-oblong, 20–35 cm. long, 18–30 cm. broad, simply pinnate;

pinnae 2-6 pairs and a conform terminal one, distant, subopposite or alternate, mostly oblique, narrowly oblong to elliptic-linear or oblanceolate, abruptly acuminate, subtire to coarsely serrate-crenate, ciliolate, 12-20 cm. long, 3-6 cm. broad, often gemmiparous in the axils, the basal ones mostly short-stalked, subcuneate at base, those above sessile and rounded; costae elevated, stramineous; costules numerous, oblique, elevated, 4-8 mm. apart; veins 6-9 pairs, distant, oblique, the lower 2-4 acutely united and meniscoid, usually the next 2 or 3 pairs alternately united in a common veinlet running to the sinus; sori in a double row between the costules, large, round or oval, the sporangia setose; indusia wanting. Leaf-tissue dark green, herbaceo-charactaceous, together with the veins, costules, and costae pilosulous beneath.

Mountain forests and moist shady banks, at lower to higher elevations, Porto Rico; St. Thomas; reported from St. Croix and St. Jan.—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Montserrat; Martinique; Barbados; St. Vincent; Grenada; Trinidad; Tobago. Guatemala to Peru and Brazil.

16. *Dryopteris subtetragona* (Link) Maxon.

Polypodium tetragonum Sw. Prodr. 132. 1788. Not *Nephrodium tetragonum* Presl, 1825.

Polypodium subtetragonum Link, Hort. Berol. 2: 105. 1833.

Polypodium imbricatum Liebm. Dansk. Vid. Selsk. Skrift. V. 1: 210. 1849.

Dryopteris tetragona Urban, Symb. Ant. 4: 20. 1903. Not Kuntze, 1891.

Rhizome short-creeping, epigeal, 1-2 cm. thick, the apex clothed with dark castaneous, stellate-pubescent scales. Fronds several, close, subdimorphous, the fertile ones erect, up to 1 m. high, long-stipitate, the sterile ones shorter, arching; stipes stramineous, sulcate-quadrangular, stellate-pubescent; blades ovate-oblong to deltoid-oblong, mostly 30-45 cm. long, 12-25 cm. broad, pinnate; pinnae 6 to 12 pairs and a conform terminal one, distant, subopposite, short-stalked, linear-attenuate, spreading, or the lower ones deflexed, narrowed at base, and lance-elliptic; sterile pinnae mostly 2-3 cm. broad, the fertile ones 1-2 cm., all pinnatifid two-thirds or halfway to the elevated hirtellous costa; segments oblique, close, oblong to deltoid-oblong, acute or acutish, entire, ciliolate; veins 6-10 pairs, simple, the basal pair usually united, the branch excurrent to the sinus; sori close, inframedial, exindusiate, the sporangia setose. Leaf-tissue thin-herbaceous, pellucid, usually glabrous.

Wooded banks and rich rocky woods, at lower and middle elevations, Porto Rico; Tortola; Vieques; St. Thomas; St. Croix; St. Jan.—Jamaica; Cuba; Hispaniola; St. Kitts; Antigua; Guadeloupe; Dominica; Montserrat; Martinique; Barbados; St. Vincent; Grenada; Trinidad. Florida; Mexico to Brazil and Ecuador.

17. *Dryopteris megalodus* (Schkuhr) Urban, Symb. Ant. 4: 21. 1903.

? *Polypodium pennatum* Poir. in Lam. Encycl. 5: 535. 1804.

Polypodium megalodus Schkuhr, Krypt. Gewächse. 1: 24. pl. 19b. 1806.

Goniopteris megalodus Presl, Tent. Pter. 182. 1836.

Aspidium megalodus Mett. Fil. Lechl. 2: 21. 1859.

Goniopteris quadrangularis Fée, Mém. Foug. 11: 66. pl. 16, f. 3. 1866.

Rhizome stout, short-creeping, the apex bearing numerous glossy, castaneous, stellate-pubescent scales. Fronds several, arching, 0.6-1 m. long, the stipes long, olivaceous from a brownish base, subquadrangular, sulcate, at first minutely stellate-pubescent; blades transversely oblong to broadly deltoid-oblong, 35-70 cm. long, 30-55 cm. broad, the rachis slender, subflexuous; pinnae 6-10 pairs and a large conform terminal one, distant, spreading, alternate, linear, abruptly acuminate-attenuate, 15-28 cm. long, 2.5-6 cm. broad, the lower and middle ones stalked, the lowermost narrowed at base and deflexed, all pinnately lobed one-third or halfway to the pale brownish costa; lobes very close, falcate, distally acutish, faintly crenate, setose-ciliolate, 7-10 mm. broad at base, the costule, veins, and brownish-green membrano-herbaceous leaf-tissue very minutely stellate-puberulous on both sides; veins 10-16 pairs, the basal ones united, the

next 2-4 pairs usually running to a linear sinus membrane; sori small, medial, the sporangia glabrous; indusia vestigial, stellate-pubescent.

At lower elevations, in partial shade, Porto Rico:—Cuba; Hispaniola; Martinique; St. Vincent; Trinidad; Tobago. Mexico to Venezuela and Ecuador.

18. *Dryopteris domingensis* (Spreng.) Maxon.

Polypodium scolopendroides L. Sp. Pl. ed. 2, 1585. 1763. Not L. 1753.

Polypodium guadalupense Wikstr. Sv. Vet. Akad. Handl. 1825: 435. 1826.

Polypodium domingense Spreng. Syst. Veg. 4: 51. 1827.

Goniopteris affinis Fée, Gen. Fil. 250. 1852.

Nephrodium scolopendroides Hook. Sp. Fil. 4: 65. 1862.

Dryopteris scolopendroides C. Chr. Ind. Fil. 291. 1905. Not Kuntze, 1891.

Dryopteris guadalupensis C. Chr. Biol. Arb. Warm. 84. 1911. Not Kuntze, 1891.

Rhizome small, suberect, with an apical tuft of pale brown, stellate-pubescent scales. Fronds in a close crown, 15-60 cm. long, subdimorphic, the sterile ones small and short-stipitate, recurved or prostrate, the fertile elongate, long-stipitate, erect; blades 10-40 cm. long, 2-10 cm. broad at middle, lanceolate or narrowly oblanceolate to linear-attenuate, pinnate at base, with 1 or several pairs of reduced, distant, auriculate-oblong or rounded-hastate, sessile or short-stalked pinnae, pinnatifid above, the lobes of sterile blades broadly joined, close, with acute sinuses, those of fertile blades narrower, dilatate at base, with broad, acutish or rounded sinuses; segments variable, the larger ones deltoid-oblong to linear-oblong, obtuse or acutish, entire to crenate, minutely stellate-pubescent throughout; costae elevated; veins 8-15 pairs, mostly forked or pinnately branched, the basal veinlets joined, a series of areoles thus formed along the main rachis and the costae; sori inframedial; indusia minute, stellate-pubescent.

Dryish shrubby hillsides and moist rocky gulches in partial shade, usually on limestone, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Guadeloupe; Martinique.

19. *Dryopteris sclerophylla* (Kunze) C. Chr. Biol. Arb. Warm. 84. 1911.

Aspidium sclerophyllum Kunze in Spreng. Syst. Veg. 4: 99. 1827; Linnaea 9: 92. 1834.

Aspidium dissidens Mett. Abh. Senckenb. Ges. Frankfurt 2: 400. 1858.

Nephrodium jamaicense Baker; Jenman, Journ. Bot. Brit. & For. 15: 264. 1877.

Dryopteris dissidens Kuntze, Rev. Gen. Pl. 2: 812. 1891.

Aspidium Sintenisii Kuhn & Christ, Bot. Jahrb. Engler 24: 119. 1897.

Dryopteris Sintenisii Urban, Symb. Ant. 4: 19. 1903.

Dryopteris jamaicensis C. Chr. Ind. Fil. 272. 1905.

Rhizome erect, 2-10 cm. high, 1-2 cm. thick; scales castaneous, glossy, stellate-pubescent. Fronds many, in a close crown, rigidly ascending, 25-60 cm. long, the stipes shorter than the blades, pale, sulcate, scaly at base, densely stellate-pubescent; blades 20-40 cm. long, 5-16 cm. broad, ovate to lance-oblong or oblanceolate, acuminate, pinnate nearly throughout in mature plants, everywhere stellate-pubescent; pinnae mostly sessile or short-stalked from a deeply cordate base, the lower pairs reduced and reflexed, the middle ones spreading, close or apart, narrowly oblong-acuminate, 3-8 cm. long, 1-2 cm. broad, deeply serrate to pinnatifid, the lobes broadly joined, oblique, rounded-deltoid to oblong, 3-5 mm. broad, often acute in drying, with open acute sinuses; veins simple or forked, the basal ones united, forming costal areoles, similar costular areoles not uncommon; sori medial or supramedial, the sporangia glabrous; indusia distinct, elevated, stellate-pubescent. Leaf-tissue rigidly herbaceous, dull green.

Wet forest near Cayey, Porto Rico (*Sintenis 2136*); also collected by Palbis:—Jamaica; Cuba; Hispaniola.

20. **Dryopteris reptans** (Gmel.) C. Chr. Ind. Fil. 288. 1905.

Polypodium repens Sw. Prodr. 132. 1788. Not *P. repens* Sw. op. cit. 130.

Polypodium reptans Gmel. Syst. Nat. 2²: 1309. 1791.

Polypodium repandum Sw. Journ. Bot. Schrad. 1800²: 25. 1801. Not Lour. 1790.

Dryopteris radicans Maxon, Contr. U. S. Nat. Herb. 10: 490. 1908.

Rhizome small, decumbent, the scales stellate-pubescent. Fronds usually numerous, fasciculate, laxly ascending to procumbent and proliferous, mostly 15–50 cm. long, polymorphic, the stipes pale, equaling the blade or not, deciduously stellate-pubescent; blades mostly 10–30 cm. long, 3–10 cm. broad, oblong-acuminate to lanceolate or linear-attenuate, pinnate in the lower half or nearly throughout; pinnae distant to approximate, mostly short-stalked, linear to oblong or oval, truncate or usually subcordate at base, rounded-obtuse to acuminate at apex, subentire, crenate, or crenately lobed, firmly herbaceous to membranous, minutely stellate-pubescent on both sides, the costae, costules, and veins sparsely hirtellous with simple hairs beneath; veins 2–7 pairs, the basal ones usually united, the veinlet excurrent to the sinus; sori inframedial, small, the sporangia deciduously stellate-setulose; indusia vestigial, bearing a few long, simple or forked hairs.

Rocky banks, cliffs, and partially shaded slopes, at lower to higher elevations, Porto Rico:—Jamaica; Cuba; Bahamas; Hispaniola; Guadeloupe. Florida; Mexico; Guatemala; reported from Venezuela.

21. **Dryopteris Brittonae** Slosson, sp. nov.

Rhizome decumbent, 2 cm. thick; scales tufted, linear-attenuate, 1–1.5 cm. long, castaneous, flaccid, sparsely stellate-pubescent. Fronds several, 50–115 cm. long, weak, laxly arching, the stipe half as long as the blades or less, stramineous, lustrous, sulcate, minutely stellate-pubescent, glabrescent; blades 35–75 cm. long, 10–20 cm. broad, narrowly oblong-acuminate to lance-linear, not or slightly reduced at base, evenly long-attenuate at apex, pinnate throughout; pinnae 18–25 pairs, stalked (2–4 mm.), subopposite or alternate, one to several times their width apart, the basal ones deflexed, those of the lower third largest, 5–10 cm. long, 1.5–3 cm. broad, exactly lanceolate to narrowly oblong-acuminate (the tip attenuate-caudate, crenate to entire), subcordate at base, obliquely pinnatifid, the lobes oblong to linear, rounded-obtuse, subentire, 6–15 mm. long, 3–5 mm. wide at base, broadly joined, only the basal pair sometimes free; costae elevated; veins 5–15 pairs, oblique, prominent, mostly simple, the basal pair united below the callous acutish sinus or meeting there; sori submarginal, small, non-indusiate. Leaf-tissue membrano-herbaceous, sublustrous above, together with the costae, costules, and veins minutely and sparsely stellate-pubescent on both sides, the veins also setose above with long oblique simple hairs.

Among rocks in wooded ravines, at lower and middle elevations, Porto Rico; abundant near Maricao. Type (herb. N. Y. Botanical Garden) from Quebrado de Limones, near Mayaguez (*Britton & Marble 681*). Endemic.

22. **Dryopteris guadalupensis** (Fée) Kuntze, Rev. Gen. Pl. 2: 812. 1891.

Aspidium nephrodoides Klotzsch, Linnaea 20: 370. 1847. Not Hook. 1862.

Nephrodium guadalupense Fée, Mém. Foug. 11: 89. pl. 24, f. 3. 1866.

Dryopteris nephrodoides Hieron. Hedwigia 46: 327. 1907. Not Kuntze, 1891.

Rhizome oblique, 8–10 cm. long, 1–1.5 cm. thick, bearing a few thin stellate-pubescent scales. Fronds cespitose, ascending, 0.5–1.2 m. long, the stipes long, dull stramineous, stellate-pubescent, similar hairs borne throughout the frond; blades lance-ovate to ovate-oblong, acuminate, 30–70 cm. long, 20–50 cm. broad, pinnate-pinnatifid; pinnae numerous, distant, linear-attenuate, short-stalked, usually narrowed at the rounded-subcordate base (the gradually reduced upper

ones truncate distally), the middle and lower ones 10–25 cm. long, 1.5–3 cm. broad, all pinnatifid half or two-thirds the distance to the stramineous costa; segments close, oblong, subfalcate, rounded or distally acutish, entire, obliquely ciliate, 3–5 mm. broad; veins 10–12 pairs, close, sparsely hispid above, the basal pair connivent to the narrow acute sinus or sometimes united, the veinlet excurrent; sori numerous, medial, the sporangia glabrous; indusium small, stellate-pubescent, persistent. Leaf-tissue dark grayish-green, membrano-herbaceous, pellucid.

Collected by Balbis (Berlin Herb.), probably at a lower or middle altitude, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Martinique; St. Vincent; Trinidad. Northern South America.

23. *Dryopteris hastata* (Fée) Urban, Symb. Ant. 4: 21. 1903.

Goniopteris hastata Fée, Mém. Foug. 11: 65. pl. 18, f. 1, in part. 1866.

Rhizome short-creeping, nodose, the apex clothed with thin stellate-pubescent scales. Fronds several, close, the fertile ones long-stipitate, up to 85 cm. long; stipes 15–45 cm. long, stramineous from a darker paleaceous base, sulcate, minutely stellate-pubescent; blades 25–40 cm. long, 15–22 cm. broad, elliptic to ovate-oblong, fully pinnate in the lower two-thirds, abruptly narrowed to an elongate, pinnatifid or pinnately lobed apex, this sometimes as long as the part below; pinnae 4–10 pairs, 8–10 cm. long, 1.5–2 cm. broad, oblong-linear, evenly acuminate, broadest at middle, mostly distant and subsessile, the lower ones usually shorter and deflexed, the upper ones semiadnate, upwardly falcate, all broadly crenate, the lobes low, often truncate; costae and costules slender, stramineous; veins about 6 pairs, the lower 2 or 3 pairs united alternately into a flexuose veinlet running to the sinus, or the basal pair meniscoid; sori in 2 rows between the costules, inframedial, large, the sporangia setose with 2–3-furcate hairs; indusia wanting. Leaf-tissue membrano-herbaceous, pellucid, together with the veins, costules, and costae hirtellous beneath with simple and furcate hairs.

Wooded slopes, among limestone rocks, at lower elevations, Porto Rico:—Guadeloupe; Trinidad; Tobago.

24. *Dryopteris leptocladia* (Fée) Maxon.

Goniopteris leptocladia Fée, Mem. Foug. 11: 60. pl. 16, f. 1. 1866.

Aspidium asplenioides f. *exindusiatum* Kuhn, Bot. Jahrb. Engler 24: 119. 1897.

Dryopteris hastata leptocladia C. Chr. Dansk. Vid. Selsk. Skrift. VII. Naturv. Afd. 10²: 230. 1913.

Dryopteris hastata subauriculata Kuhn; C. Chr. loc. cit.

Rhizome oblique, 1–1.5 cm. thick, the apex freely clothed with narrow, glossy, brown, finely stellate-pubescent scales. Fronds several, fasciculate, 50–70 cm. long, the fertile ones long-stipitate, the stipes pale olivaceous, deeply sulcate, closely stellate-pubescent; blades 35–50 cm. long, 15–22 cm. broad, lanceolate to broadly ovate-oblong, pinnate in the lower two-thirds, abruptly acuminate-attenuate, the apex pinnatifid and pinnately lobed; pinnae 10–17 pairs, distant, mostly 8–12 cm. long, 1–2 cm. broad, linear, long-acuminate, the basal ones somewhat reduced, subcordate, sessile, the middle ones sessile or semiadnate, the upper adnate, confluent, all obliquely lobed halfway or one-third the distance to the costa, the lobes very close, rounded-acutish, rigidly ciliate; veins 5–9 pairs, the basal pair united, the veinlet excurrent to the sinus; sori small, inframedial, exindusiate, the sporangia stellate-setulose. Leaf-tissue membrano-herbaceous, glabrous, the veins, costules, and costae thinly hirtellous beneath with stalked, furcate and stellate hairs.

Thickets and shady slopes at lower elevations, on limestone, Porto Rico:—Hispaniola; Guadeloupe; Martinique.

25. **Dryopteris angustifolia** (Willd.) Urban, Symb. Ant. 4: 21. 1903.

Meniscium angustifolium Willd. Sp. Pl. 5: 133. 1810.

Phegopteris angustifolia Mett. Fil. Lechl. 2: 22. 1859.

Rhizome short-creeping, 1–2 cm. thick, scurfy-paleaceous, bearing a mass of coarse roots. Fronds several, close, rigidly ascending, 20–70 cm. long, subdimorphous, the fertile ones long-stipitate; stipes stout, finely puberulous, stramineous from a darker scurfy-paleaceous base; blades oblong, 15–50 cm. long, 8–28 cm. broad, simply pinnate, the rachis flattish, sulcate, stramineous, strigillose-puberulous; pinnae 8–22 pairs and a conform terminal one, lance-linear, long-attenuate at apex, narrowly cuneate at base, stalked, 5–16 cm. long, 0.5–2 cm. broad, entire, short-ciliate; costae stout, elevated, strigillose-puberulous or glabrate; veins numerous, 1.5–2 mm. apart, oblique, lightly arcuate, elevated, glabrescent; areoles 3–12 rows, curved-oblong; sori numerous, close, linear-oblong, confluent and usually covering the blade. Leaf-tissue herbaceo-chartaceous, dull-green, pale beneath, glabrous.

Wet rocks along streams, at lower to higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola. Costa Rica to Bolivia.

26. **Dryopteris serrata** (Cav.) C. Chr. Ind. Fil. 291. 1905.

Meniscium serratum Cav. Descr. Pl. 548. 1803.

Phegopteris serrata Mett. Ann. Sci. Nat. V. Bot. 2: 243. 1864.

Nephrodium serrata Keys. Pol. Cyath. Herb. Bung. 49. 1873.

Rhizome short-creeping, 1–2 cm. thick. Fronds closely distichous, erect, 1–2 m. long; stipes stout, yellowish-stramineous from a dark arcuate base, sulcate, glabrescent; blades broadly oblong to deltoid-lanceolate, 50–90 cm. long, 20–45 cm. broad, simply pinnate, the stout yellowish rachis glabrescent; pinnae oblique, distant, mostly short-stalked, unequal (the upper ones gradually reduced), narrowly deltoid-lanceolate or linear-attenuate from a broader, unequally cuneate base, mostly 10–25 cm. long, 1–3.5 cm. broad, sharply serrate, the apical teeth often hamate; costae stout, stramineous, prominent, hirtellous beneath; veins oblique, elevated, arcuate, 2–3 mm. apart, persistently hirtellous; areoles 7–18 pairs, strongly inequilateral, the crossveins of sterile areoles distally acute; sori linear-arcuate, usually confluent. Leaf-tissue rigidly herbaceous to herbaceo-chartaceous.

Swamp, near Utuado, Porto Rico (*Sintenis* 6378):—Jamaica; Cuba; Guadeloupe. Mexico to Bolivia and Brazil.

27. **Dryopteris reticulata** (L.) Urban, Symb. Ant. 4: 22. 1903.

Polypodium reticulatum L. Syst. Nat. ed. 10, 2: 1325. 1759.

Meniscium reticulatum Sw. Journ. Bot. Schrad. 1801²: 274. 1803.

Phegopteris reticulata Mett. Fil. Lechl. 2: 24. 1859.

Nephrodium reticulatum Keys. Pol. Cyath. Herb. Bung. 49. 1873.

Rhizome short-creeping, 1–2.5 cm. thick, bearing a mass of coarse roots, the exposed apex clothed with appressed reddish-brown scales. Fronds several, close, rigidly ascending, 1–2.5 m. long, the fertile ones long-stipitate; stipes stout, dull stramineous from a dark base, sulcate, thinly puberulous; blades deltoid-oblong to lance-oblong, 0.5–1.2 m. long, 30–60 cm. broad, simply pinnate, the rachis dull stramineous, glabrescent; pinnae numerous, contiguous or slightly apart, subequal, mostly sessile (the basal pair short-stalked, often gemmiparous at base), ligulate-attenuate to lance-deltoid and evenly attenuate-caudate, 18–35 cm. long, 2–6 cm. broad near the unequally rounded or broadly cuneate base, the margins entire, undulate, or slightly crenate; costae stout, stramineous, thinly hirtellous; veins elevated, oblique, subarcuate, 2–5 mm. apart, thinly hirtellous, glabrescent; areoles 8–18 pairs, inequilateral, the fertile ones arcuate, the sterile ones strongly so (the distal end rectangular to acutish); sori numerous, linear-oblong, often confluent. Leaf-tissue herbaceo-chartaceous, dull or yellowish green, glabrous.

Moist rocky banks or depressions, usually in partial shade along streams, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada. Florida; Mexico to Brazil.

28. **Dryopteris hirta** (Sw.) Kuntze, Rev. Gen. Pl. 2: 813. 1891.

Polypodium hirtum Sw. Prodr. 133. 1788.

Aspidium hirtum Sw. Journ. Bot. Schrad. 1800²: 39. 1801.

Polypodium barbatum Kunze; Spreng. Syst. Veg. 4: 57. 1827.

Cystopteris hirta Klotzsch, Linnaea 20: 361. 1847.

Cystopteris rufescens Fée, Gen. Fil. 300. 1852; Mém. Foug. 6: 22. pl. 6, f. 2. 1853.

Rhizome stout, decumbent, densely clothed with tufted, brown, lance-linear, attenuate scales. Fronds several, fasciculate, erect-spreading 15–30 cm. long; stipes 8–15 cm. long, glandular and barbate-paleaceous, the scales spreading or deflexed, dark brown, narrowly lance-attenuate, hair-pointed; blades deltoid to ovate-deltoid, acute, 7–20 cm. long, 6–15 cm. broad, 3-pinnate at base, the rachises freely barbate-paleaceous, the scales of the costae shorter, usually bullate and iridescent; basal pinnae largest, long-stalked, unequally deltoid; middle pinnae oblong, acutish, nearly equilateral, 1–2.5 cm. broad, the pinnules distant, sessile to adnate, pinnatisect to serrately lobed, the lobes or segments distant, oblong to deltoid-oblong, densely glandular-pubescent with short, turgid, 1-celled hairs; sori small, medial; indusia small, reddish, glandulose, evanescent.

Roadside banks and damp rocky ravines, at lower to higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola.

29. **Dryopteris nemorosa** (Willd.) Urban, Symb. Ant. 4: 15. 1903.

Aspidium nemorosum Willd. Sp. Pl. 5: 255. 1810.

Aspidium lepidotrichum Desv. Ges. Naturf. Freund. Berlin Mag. 5: 321. 1811.

Nephrodium nemorosum Desv. Mém. Soc. Linn. Paris 6: 261. 1827.

Nephrodium myriolepis Baker, Journ. Bot. Brit. & For. 26: 34. 1888.

Dryopteris myriolepis C. Chr. Ind. Fil. 279. 1905.

Rhizome short, curved-decumbent, with a conspicuous tuft of long, linear-attenuate, bright brown scales. Fronds several, ascending, 30–65 cm. long, the stipe short, conspicuously crinite-paleaceous; blades ovate to oblong-ovate, acuminate, 20–40 cm. long, 12–28 cm. broad, 2-pinnate-pinnatisect throughout, the primary rachis crinite-paleaceous; pinnae about 10 pairs, subopposite, mostly ovate-oblong, acuminate, the basal and second pairs distant, inequilateral, the lower side broadest above the base; pinnules close, narrowly oblong, acutish, mostly 1.5–3 cm. long, 5–10 mm. broad, semiadnate to adnate, decurrent, oblique, obliquely pinnatisect, the segments oblong, 1.5–2 mm. broad, acute, entire or distantly serrate; costae bullate-paleaceous beneath, the scales hair-pointed, yellowish brown; sori 1–5 per lobe; indusia large, circular, with overlapping sinus lobes and dark center, thin, persistent. Leaf-tissue membrano-herbaceous, drying brownish.

Shady limestone banks and rocky slopes, at lower to higher elevations, Porto Rico:—Hispaniola.

30. **Dryopteris subincisa** (Willd.) Urban, Symb. Ant. 4: 19. 1903.

Polypodium subincisum Willd. Sp. Pl. 5: 202. 1810.

Polypodium caribaeum Desv. Ges. Naturf. Freund. Berlin Mag. 5: 319. 1811.

Alsophila martinicensis Spreng. Neu. Entd. 3: 7. 1822.

Phegopteris subincisa Fée, Gen. Fil. 243. 1852.

Phegopteris epiarioides Fée, op. cit. 248.

Nephrodium villosum subincisum Jenman, Bull. Bot. Dept. Jamaica II. 3: 114. 1896.

Rhizome stout, erect, the crown densely scaly. Fronds erect-spreading, up to 2.5 m. long; stipes up to 75 cm. long and 1.5 cm. thick, light brown, densely paleaceous, the scales linear-attenuate, 1-3 cm. long, castaneous, lustrous, toothed; blades deltoid-ovate, mostly 1-2 m. long, 3-pinnate-pinnatifid at base, 2-pinnate-pinnatifid above, the rachis pale brown, deciduously fibrillose-scaly; basal pinnae much the largest, stalked, unequally deltoid, produced at lower base, 30-90 cm. long; middle pinnae narrowly oblong-acuminate, the pinnules distant, spreading, oblong-acuminate, 6-10 cm. long, mostly short-stalked or sessile, the upper ones adnate-decurrent; segments close, oblong, 3-5 mm. broad, subfalcate, rounded at apex, entire, ciliate, similar but longer hairs borne on the costae, costules, and veins of both sides and sparingly on the membrano-herbaceous leaf-tissue; veins 5-7 pairs, simple or forked; sori small, medial; indusia wanting.

Moist forest slopes, at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Martinique, St. Vincent; Grenada. Mexico to Paraguay.

31. ***Dryopteris chaerophylloides*** (Poir.) C. Chr. Dansk. Vid. Selsk. Skrift. VIII. Naturv. Afd. 6¹: 105. f. 22. 1920.

Polypodium chaerophylloides Poir. in Lam. Encycl. 5: 542. 1804.

Polypodium portoricense Spreng. Nov. Act. Acad. Caes. Leop. Carol. 10: 230. 1821.

Phegopteris portoricensis Fée, Gen. Fil. 243. 1852.

Rhizome creeping, 2-5 mm. thick, hairy, laxly paleaceous, the scales reddish-brown, lance-deltoid. Fronds few, subdistant, arching, 30-70 cm. long, the stipes stoutish, dark stramineous, usually much longer than the blade, curved, deciduously scaly and long-hairy at base; blade deltoid-pentagonal, long-acuminate, 15-30 cm. long, 10-25 cm. broad, 3-pinnate at base, elsewhere 2-pinnate, the rachises sulcate above and densely short-pubescent, deciduously long-hairy beneath; basal pinnae much the largest, up to 20 cm. long, deltoid, inequilateral, produced at lower base; pinnules stalked, those of middle pinnae obliquely ovate-oblong, 2-3.5 cm. long, obliquely lobed at base, above coarsely serrate to the sharply acute tip; leaf-tissue dark green, chartaceous, deciduously long-hairy beneath; sori large (2 mm.), distant, a few long hairs mixed among the sporangia; indusia altogether wanting.

Rocky forest ravines and shaded water-courses, at lower to higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola. Listed by Urban as *Dryopteris pubescens* (L.) Kuntze and *D. pubescens sericea* (Mett.) Urban.

32. ***Dryopteris effusa*** (Sw.) Urban, Symb. Ant. 4: 16. 1903.

Polypodium effusum Sw. Prodr. 134. 1788.

Polypodium multifidum Jacq. Coll. Bot. 3: 187. 1789.

Polypodium divergens Schkuhr, Krypt. Gewächs. 27. pl. 26b. 1806.

Polypodium miser Hew. Mag. Nat. Hist. II. 2: 460. 1838.

Polypodium dilatatum Liebm. Dansk. Vid. Selsk. Skrift. V. 1: 208. 1849.

Phegopteris divergens Fée, Gen. Fil. 243. 1852.

Phegopteris effusa Fée, loc. cit.

Nephrodium effusum Baker in Hook. & Baker, Syn. Fil. 287. 1867.

Rhizome short-creeping, 1.5-2 cm. thick, bearing a few large, thin, reddish-brown scales. Fronds few, close, erect-arching, 0.5-2 m. long, the stipes 0.2-1 m. long, stout, dark stramineous, sulcate, scaly at base; blade deltoid, long-acuminate, 0.3-1 m. long, nearly as broad, 3-4-pinnate and pinnatifid, the primary rachis densely pubescent above, nearly glabrous beneath, usually bearing a scaly bud toward the tip; basal pinnae much the largest, stalked, 15-50 cm. long, deltoid, inequilateral, strongly produced at lower base, those above deltoid-ovate, stalked; ultimate segments mainly oblong or ovate-oblong, acuminate, serrate to serrate-pinnatifid, decurrent, the ultimate rachises thus distinctly alate; leaf-tissue bright green, lustrous above, beneath bearing many minute, appressed, reddish, glandlike hairs; sori numerous, small, subterminal upon the oblique veinlets; indusia wanting.

Forest ravines and shady stream banks, at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Martinique; St. Vincent; Grenada; Trinidad. Mexico to Brazil and Bolivia.

Dryopteris panamensis (Presl) C. Chr. is reported from Porto Rico on a single specimen collected long ago by Balbis, which probably pertains to the closely related *D. opposita* (Vahl) Urban. It is not found in recent large collections.

Dryopteris asplenioides (Sw.) Kuntze in several forms was erroneously recorded from Porto Rico by Urban on specimens now referred to *D. reptans* (Gmel.) C. Chr., *D. domingensis* (Spreng.) Maxon, *D. leptocladia* (Fée) Maxon, and *D. hastata* (Fée) Urban.

Dryopteris cordata (Fée) Urban was erroneously reported from Porto Rico by Urban on the basis of *Sintenis* 6380 and 6588, which are a form of *D. reptans* (Gmel.) C. Chr.

Polypodium incisum Sw., listed from St. Croix by Eggers on the authority of West, is a doubtful record which may pertain to *Dryopteris scolopendroides* (L.) Kuntze or *D. domingensis* (Spreng.) Maxon, which have been greatly confused. Neither species is known otherwise from the Virgin Islands.

Dryopteris trichophora (Fée) Kuntze, a Lesser Antilles plant known properly as *D. Herminieri* (Kunze) C. Chr., was ascribed to Porto Rico by Urban on the basis of *Wilson* 250, which is *D. dentata* (Forsk.) C. Chr.

40. **TECTARIA** Cav. An. Hist. Nat. (Madrid) 1: 115. 1799.

Mostly large ferns of wet forests and shady banks, the rhizome stout, woody, short-creeping to erect, paleaceous. Fronds few, suberect or recurved, the stipes usually firm and lustrous, stramineous to atropurpureous, not jointed to the rhizome; blades various, narrowly elongate and simple, broader and 1–2-pinnatifid, or commonly deltoid and pinnately decompound, the divisions mostly coarse. Veins mostly anastomosing, the areoles with or without included free venules. Sori numerous, irregularly disposed or borne in open rows near the ultimate costae, sometimes on the included venules. Indusia persistent to caducous (or apparently sometimes wanting), orbicular and centrally peltate to roundish-reniform. (Latin, alluding to the protective indusial covering.) About 125 species, mainly tropical. Type species: *Polypodium trifoliatum* L.

Blades simple, often viviparous at apex.

1. *T. plantaginea*.

Blades pinnate, not viviparous at apex.

Areoles very rarely with a short included venule.

2. *T. cicutaria*.

Areoles mostly with free included venules.

Indusia orbicular, entire, centrally peltate.

3. *T. heracleifolia*.

Indusia reniform, attached at the sinus.

Sori biserial, restricted to a row at either side of the costules; pinnae usually numerous.

4. *T. martinicensis*.

Sori biserial, also disposed irregularly between the costules; pinnae few, the apical one very large.

5. *T. trifoliata*.

1. **Tectaria plantaginea** (Jacq.) Maxon, Contr. U. S. Nat. Herb. 10: 494. 1908.

Polypodium plantagineum Jacq. Coll. Bot. 2: 104. pl. 3, f. 1. 1788.

Aspidium plantagineum Griseb. Abh. Ges. Wiss. Göttingen 7: 286. 1857.

Podopeltis plantaginea Fée, Gen. Fil. 9. 1852.

☞ *Dryomenis plantaginea* J. Smith in Seem. Bot. Voy. Herald 229. 1854.

Bathmium plantagineum Fourn. Bull. Soc. Bot. France 19: 254. 1872.

Rhizome creeping, 5–10 cm. long, 3–7 mm. thick, woody, dark-paleaceous. Fronds ascending, closely distichous, 20–60 cm. long, the stipe usually much shorter than the blade, laxly clothed with dark spreading subulate scales, these extending to the costa and sparingly to the costules beneath; blades simple, 12–50 cm. long, 4–11 cm. broad, varying from exactly oblong and acutish or subrotund at both ends to oblanceolate or pointed-elliptic and long-decurrent below, the apex often retuse and viviparous; margins undulate to sinuate; costae slightly oblique, dark, elevated, subflexuous, with about 6–8 major areoles between; minor areoles numerous, mostly with 1 or 2 simple or broadly forked, clavate, included venules; sori large, mostly borne in 2 distant rows between the costules, never on the included venules; indusia caducous. Leaf-tissue very dark dull green, opaque, glabrous, chartaceo-herbaceous in drying.

Rocky slopes of wet forest ravines, at lower and middle elevations, Porto Rico;—St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad; Tobago. Costa Rica to the Guianas.

2. **Tectaria cicutaria** (L.) Copel. Philippine Journ. Sci. Bot. **2**: 410. 1907.

Polypodium cicutarium L. Syst. Nat. ed. 10, **2**: 1326. 1759.

Polypodium hippocreps Jacq. Coll. Bot. **3**: 186. 1789; Icon. Pl. Rar. **3**: 21. pl. 641. 1786–93.

Aspidium cicutarium Sw. Journ. Bot. Schrad. **1800**²: 36. 1801.

Aspidium hippocreps Sw. Syn. Fil. 51. 1806.

Tectaria hippocreps Copel. loc. cit.

Rhizome woody, decumbent, up to 10 cm. long and 2 cm. thick, the apex with a tuft of long, acicular, light brown scales. Fronds several, ascending or wide-spreading, up to 1.2 m. long (mostly 25–70 cm.), the stipe much shorter than the blade, yellowish brown to light castaneous, deciduously divaricate-paleaceous; blades narrowly oblong to oblong-ovate, 15–65 cm. long, 8–35 cm. broad, acuminate, pinnate in the lower half or beyond, the rachis minutely paleaceous; pinnae in general elongate-deltoid, the basal pair stalked, distant, usually shorter than the second, inequilateral, coarsely pinnatifid-lobate on both sides (broadest below), the segments lightly sinuate and rounded or acutish, or the basal ones shallowly lobed and acuminate; succeeding pinnae narrower and simpler, sessile or short-stalked, mostly deltoid-oblong, the upper ones shorter, lance-acuminate, decurrent, at last broadly confluent; lobes in general roundish or subacute, the margins entire to erose-sinuate; areoles angular, nearly all without included venules; sori large, distant, nearer the costule than the margin; indusia reniform, persistent. Leaf-tissue dull gray-green, drying brownish, spongiose-herbaceous, septate-puberulous to glabrate.

Dryish shady limestone banks and cliffs, at lower and middle elevations, Porto Rico;—Jamaica; Cuba; Hispaniola. Highly variable, consisting of three main regional types. The largest measurements apply to the Cuban form.

3. **Tectaria heracleifolia** (Willd.) Underw. Bull. Torrey Club **33**: 200. 1906.

Aspidium heracleifolium Willd. Sp. Pl. **5**: 217. 1810.

Bathmium heracleifolium Fée, Gen. Fil. 287. 1852.

Rhizome erect or curved-ascending, stout, 1–2 cm. thick, the apex minutely brown-paleaceous. Fronds several, fasciculate, erect-arching, 50–85 cm. long, the stipes longer than the blades, lustrous, sulcate, stramineous or yellowish brown from a finely paleaceous, castaneous base; blades deltoid-ovate, 20–40 cm. long, 15–30 cm. broad, pentagonal, pinnately 3-foliate or sometimes with 2 (rarely 3) pairs of laxly ascending lateral pinnae; basal pinnae largest, stalked, deltoid in outline, usually deeply 3-lobed, the terminal lobe largest, the proximal one larger than the distal, all elongate, attenuate to caudate, and (the distal one excepted) coarsely crenate-dentate to serrately incised; middle pinnae oblong-lanceolate, long-attenuate, subsessile; apical pinna deltoid in outline, pinnately cleft, the main lobes (1 or 2 pairs) oblique, attenuate, the apex coarsely inciso-serrate; venation prominulous; areoles rather large, a majority with simple or

once-forked included venules; sori round, large (2-3.5 mm.), biserial; indusia large, orbicular, entire, centrally peltate, persistent, at first minutely puberulous. Leaf-tissue firmly papyraceous, dark green, translucent, glabrous or sometimes minutely puberulous beneath.

Moist gulches, rocky stream banks, and shaded situations generally, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Bahamas; Hispaniola; Guadeloupe; Montserrat; Martinique; Barbados; Trinidad. Florida; Mexico to Costa Rica; Venezuela.

4. ***Tectaria martinicensis*** (Spreng.) Copel. Philippine Journ. Sci. Bot. 2: 410. 1907.

Aspidium martinicense Spreng. Anleit. Gewächse. 3: 133. 1804.

Aspidium macrophyllum Sw. Syn. Fil. 43, 239. 1806.

Bathmum macrophyllum Link, Fil. Hort. Berol. 114. 1841.

Cardiochlaena macrophylla Fée, Gen. Fil. 315. 1852.

Sagenia macrophylla Moore, Ind. Fil. xxxvi. 1857.

Nephrodium macrophyllum Baker in Hook. & Baker, Syn. Fil. 300. 1867.

Rhizome erect, 2-5 cm. thick, the apex densely clothed with short, lance-deltoid, denticulate-cillolate, castaneous scales. Fronds numerous, fasciculate, suberect, 0.5-1.5 m. long, the stipes about as long as the blades, light or yellowish brown, sulcate; blades oblong-acuminate to ovate-oblong, 30-75 cm. long, 20-50 cm. broad, simply pinnate; pinnae usually 3-8 pairs, oblique or laxly ascending, the basal pair stalked, excavate below, deeply 2-lobate, the proximal division the shorter; other pinnae oblong-acuminate to linear and attenuate-caudate, 1-6 cm. broad, often constricted above the unequal sessile or semiadnate base, the margins undulate to coarsely sinuate-dentate; terminal pinna attenuate, deeply incised at base, confluent with the short-decurrent uppermost lateral pinnae; areoles prominulous, variable, mostly with 1 or 2 simple or once-forked venules; sori large, distant, biserial, a row at either side of the arcuate costules; indusia roundish-reniform, firm, persistent. Leaf-tissue membrano-papyraceous to pergamentaceous, glabrous or occasionally pubescent.

Moist thickets and wet shady ravines, at lower and middle elevations. Porto Rico:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Montserrat; Martinique; St. Vincent; Grenada (?); Trinidad; Tobago. Mexico to Paraguay and Bolivia.

5. ***Tectaria trifoliata*** (L.) Cav. Descr. Pl. 249. 1802.

Polypodium trifoliatum L. Sp. Pl. 1087. 1753.

Aspidium trifoliatum Sw. Journ. Bot. Schrad. 1800²: 30. 1801.

Aspidium Plumierii Presl, Rel. Haenk. 1: 29. 1825.

Nephrodium Sherringiae Jenman, Journ. Bot. Brit. & For. 25: 99. 1887.

Aspidium Purdiaei Jenman, Gard. Chron. III. 22: 282. 1897.

Aspidium psammisorum C. Chr. Ind. Fil. 89. 1905.

Tectaria Plumierii Copel. Philippine Journ. Sci. Bot. 2: 410. 1907.

Rhizome decumbent, stout, 2-3 cm. thick, the apex clothed with rigid, curved, lance-attenuate, dark brown scales. Fronds several, suberect, recurved, up to 1.5 m. long, the stipes longer than the blades, lustrous, yellowish-brown or light castaneous from an atropurpureous base; smaller blades 20-40 cm. long, 15-30 cm. broad, ternately lobed, with a very deeply cordate base, or pinnately 3-foliolate, the basal pinnae stalked, inequilateral, either entire and obliquely oblong-ovate from a rounded base, or elongate-deltoid, with a short, broad, curved, acutish proximal lobe, elsewhere undulate-sinuate; larger blades 40-70 cm. long, 25-55 cm. broad, with 1-4 pairs of lateral pinnae, the basal ones long-stalked, sometimes pinnately parted at base, the proximal lobe longest, acuminate, sometimes free; terminal pinna 10-25 cm. broad, broadly ovate to subhastate, acuminate, subentire or with a few short teeth or acuminate lobes; areoles small, mostly with included venules; sori irregularly biserial and scattered; indusia reniform, shriveling. Leaf-tissue papyraceous, dark green, translucent, glabrous.

Stream banks and wet rocky ravines in shady forests, at middle elevations, Porto Rico:—Hispaniola; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad; Tobago. Colombia and Venezuela.

41. **HYPODERRIS** R. Br.; Hook. Gen. Fil. *pl.* 1. 1838.

A terrestrial fern of medium size, the rhizome slender, creeping, densely paleaceous. Fronds few, distichous, subdistant, not jointed to the rhizome, stipitate; blades simple, elongate, membranous. Venation evident, the lateral veins pinnately arranged, oblique, elevated, parallel, connected by numerous flexuous-arcuate secondary veins; minor veins freely anastomosing, the areoles unequal, broadly angulate, with or without a short included venule. Sori large, unequal, roundish, scattered or irregularly biserial in the major areoles, compital, or sometimes dorsal or subterminal upon the included venules. Indusium membranous, inferior in attachment, at first subglobose and enclosing the sporangia, soon pateriform or flattish, shallowly lobed, fimbriate-ciliate. (Greek, alluding to the membranous inferior indusium.) A single species, the generic type: *Hypoderris Brownii* J. Smith.

Several continental species published under *Hypoderris* belong, with a single exception, to an undescribed genus.

1. **Hypoderris Brownii** J. Smith; Hook. Gen. Fil. *pl.* 1. 1838.

Woodsia Brownii Mett. Fil. Hort. Lips. 98. 1856.

Rhizome 10–15 cm. long, 3–5 mm. thick, densely clothed with small, thin, bright brown, subsquarrose scales. Fronds suberect, 30–85 cm. long, the stipes not equaling the blades, dull atropurpureous or brownish, sulcate in drying, finely divaricate-paleaceous; blades 20–45 cm. long, 5–20 cm. broad, the smaller ones entire, lance-oblong, acuminate at apex, subcordate at base, the larger ones hastate-lobate at base, constricted above, the lobes subfalcate, pointed-oblong to ovate-acuminate, 8–13 cm. long, 3–4.5 cm. broad; margins subentire to irregularly sinuate; rachis strongly elevated beneath, deciduously divaricate-paleaceous; veins slightly hairy beneath.

Wet slopes and cliffs, in primeval forest, at lower and middle elevations, Porto Rico:—Hispaniola; Grenada; Trinidad.

42. **OLEANDRA** Cav. An. Hist. Nat. (Madrid) 1: 115. 1799.

Rhizomes slender, erect and suffrutescent or wide-creeping, paleaceous. Fronds erect, stipitate, strongly articulate to short or elongate phyllopodia, these solitary or whorled; blades narrowly elongate, simple, entire or nearly so, firm, lustrous. Veins free, simple to 2-forked, the branches close, parallel, patent, excurrent to the cartilaginous margin. Sori dorsal, borne irregularly or in longitudinal rows near the elevated percurrent costa. Indusia orbicular to reniform, firm, fixed at the broad or narrow sinus. (Resembling the leaves of the oleander, *Nerium Oleander*, long in cultivation). Species 15–20, mainly tropical. Type species: *Oleandra neriiiformis* Cav.

1. **Oleandra articulata** (Sw.) Presl, Tent. Pter. 78. 1836.

Aspidium articulatum Sw. Journ. Bot. Schrad. 1800²: 30. 1801.

Aspidium nodosum Willd. Sp. Pl. 5: 211. 1810.

Oleandra nodosa Presl, loc. cit.

Rhizomes cylindrical, 2–4 mm. thick, wide-creeping, branched, lightly rooted, densely squarrose-paleaceous; scales ferruginous, linear-filiform from a

dark-centered, peltate, lanceolate base, glandular-ciliolate. Fronds distant, erect, 20–80 cm. long, glabrous throughout; phyllopodia slender, 1–8 cm. long, naked above the base; stipes sharply articulate, slender, olivaceous, lustrous, longer than the phyllopodia, very much shorter than the blades; blades linear or lance-linear to pointed-oblong, 15–55 cm. long, 3–7 cm. broad, acute to narrowly cuneate at base, acuminate and abruptly caudate at apex, the tip straight, 1–4 cm. long, 0.5–2 mm. broad; costa elevated beneath, bearing a few spreading cordate-deltoid castaneous scales; leaf-tissue firmly chartaceous, bright green, highly lustrous; veins patent, simple, geminate, or once forked near the base, close, excurrent to the cartilaginous subentire margin, evident; sori irregularly disposed or in short rows, mainly near the costa; indusia glabrous.

Trailing on shady rocks, logs, and the trunks of forest trees, at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad. Guatemala; Panama to Bolivia and southern Brazil.

43. **NEPHROLEPIS** Schott, Gen. Fil. pl. 3. 1834.

Rhizomes erect to scandent, usually stoloniferous, paleaceous, tuber-bearing in a few species. Fronds erect to laxly pendent, not articulate to the rhizome, slowly determinate, narrowly elongate, the stipe and rachis firm, lustrous; blades mainly linear, uniform, simply pinnate, the pinnae numerous, spreading, sessile or petiolulate, articulate and deciduous, narrow, subentire to crenate, usually auriculate at upper base. Veins free, oblique, 1–4-forked, the branches strongly clavate, all but the single fertile one of each group excurrent nearly to the margin. Sori terminal upon the first distal vein-branches, medial to submarginal, regularly uniserial. Indusia lunate to orbicular, firmly attached at the broad or narrow sinus, oblique or not, persistent. (Greek, alluding to the reniform indusia.) Species about 35, mainly tropical and of wide distribution. Type species: *Polypodium exaltatum* L.

Indusia facing the apex of the pinna, mostly with an open sinus.

Plants tuber-bearing; blades 3–8 cm. broad; indusia broadly reniform to lunate.

Fronds erect; pinnae coriaceous or thick-herbaceous, fibrillose beneath; veins immersed.

Fronds laxly spreading or pendent; pinnae membrano-herbaceous, glandular-puberulous beneath; veins evident.

Plants not tuber-bearing; blades 8–15 cm. broad; indusia orbicular-cordate.

Indusia facing the margins, with a deep narrow sinus, the sporangia spreading in all directions.

Pinnae sessile, 2.5–6 cm. long, acutely short-auriculate at upper base, convex-cuneate below, rigidly herbaceous, minutely squamulose beneath.

Pinnae petiolulate, 8–20 cm. long, usually roundish-truncate or broadly cuneate at base, membrano-herbaceous, hirtellous beneath.

1. *N. cordifolia*.
2. *N. occidentalis*.
3. *N. exaltata*.
4. *N. rivularis*.
5. *N. biserrata*.

1. **Nephrolepis cordifolia** (L.) Presl, Tent. Pter. 79. 1836.

Polypodium cordifolium L. Sp. Pl. 1089. 1753.

Aspidium tuberosum Willd. Sp. Pl. 5: 234. 1810.

Nephrolepis tuberosa Presl, Tent. Pter. 79. 1836.

Rhizomes suberect, slender, 4–12 cm. long, densely clothed with narrow thin ferruginous scales and partially supported by numerous wiry stolons, these bearing ovoid, densely paleaceous tubers (1–1.5 cm. long). Fronds numerous, erect, 30–75 cm. long, the stipes short, stout, light brown, lustrous, densely fibrillose-paleaceous; blades narrowly linear, 25–60 cm. long, 3–6 cm. broad, attenuate downward, the stout brownish rachis deciduously fibrillose-paleaceous; pinnae very numerous, horizontal, contiguous or imbricate, oblong or linear-oblong from an unequal base, the larger ones 1.5–3 cm. long, 4–8 mm. broad at

middle, acutish or rounded at apex, subcordate below at base, cordate-hastate above, the auricle broadly overlying the rachis; margins cartilaginous, lightly crenate outward; leaf-tissue coriaceous or thick-herbaceous, deciduously fibrillose beneath; veins oblique, once-forked, immersed; sori slightly supramedial, close, large; indusia broadly reniform or lunate, broadly affixed, facing the apex of the pinna, firm, persistent.

Exposed or partially shaded rocky banks and limestone cliffs, at higher elevations, Porto Rico;—Jamaica; Cuba; Hispaniola. Mexico to southern Brazil and Bolivia. Widely distributed in the Old World tropics.

2. **Nephrolepis occidentalis** Kunze, *Linnaea* 18: 343. 1844.

Nephrolepis cordifolia occidentalis Kuhn; Bot. Jahrb. Engler 24: 121. 1897.

Nephrolepis pectinata occidentalis Urban, Symb. Ant. 9: 316. 1925.

Rhizome short and small, often closely attached to a thick, ovoid, densely paleaceous tuber (1-2 cm. long). Fronds few, fasciculate, laxly spreading or pendent, 30-70 cm. long, the stipes very short, mostly stramineous from a darker base, lustrous, naked, glabrous; blades linear or lance-linear, 25-65 cm. long, 4-8 cm. broad, acutish at apex, slightly narrowed at base, the rachis pale, naked; pinnae spreading, adjacent or subimbricate, 2-4 cm. long, elongate-deltoid to pointed-oblong from a broad, inequilateral, cordate base, the large rounded upper auricle widely overlying the rachis; margins obliquely crenate, deeply so toward the acutish apex; leaf-tissue membrano-herbaceous, translucent, deciduously glandular-puberulous beneath; veins oblique, once or twice forked, evident; sori supramedial, distant or subdistant, large; indusia semicircular or lunate-reniform, broadly affixed, mostly facing the apex of the pinna, membranous, pale, translucent, persistent.

Collected in Porto Rico long ago by Bertero, according to Urban:—Hispaniola. Mexico to Costa Rica.

3. **Nephrolepis exaltata** (L.) Schott, *Gen. Fil. pl.* 3. 1834.

Polypodium exaltatum L. *Syst. Nat.* ed. 10, 2: 1326. 1759.

Aspidium exaltatum Sw. *Journ. Bot. Schrad.* 1800²: 32. 1801.

Rhizomes short, suberect, laxly clothed with linear-filiform, ferruginous or light castaneous scales and bearing numerous wiry wide-creeping stolons. Fronds usually many, suberect or spreading, up to 2.5 m. long, the stipes short, stout, pale brown, lustrous, finely and deciduously fibrillose-paleaceous; blades linear, mostly 0.5-2 m. long, 8-15 cm. broad, slightly narrowed at base, the rachis stout, light brownish, lustrous, deciduously fibrillose-paleaceous; pinnae numerous, horizontal, contiguous or subimbricate at base, mostly subfalcate, 4-8 cm. long, 8-15 mm. broad at middle, narrowly pointed-oblong from a subhastate base, subcordate-auriculate below, obtusely deltoid-auriculate above, the large upper auricle lying against or partly over the rachis; margins bluntly curvescent-serulate to finely crenate; leaf-tissue firmly herbaceous, deciduously fibrillose, semi-translucent; veins close, once or twice forked, subimmersed; sori supramedial, rather close, large; indusia orbicular-cordate (the sinus usually open, as deep as broad), facing the apex of the pinna, brown, firm, persistent.

Rocky banks and tree trunks, often in open situations, at lower and middle elevations, Porto Rico; St. Thomas; Tortola; St. Croix;—Jamaica; Cuba; Bahamas; Bermuda; Hispaniola. Florida and Mexico; widely dispersed in the Old World tropics. The Lesser Antilles specimens referred to this species mostly pertain to *N. rivularis* (Vahl) Mett., and South and Central American specimens largely to *N. pendula* (Raddi) J. Smith.

Known usually as SWORD-FERN. The well-known BOSTON-FERN is a horticultural variety (var. *bostoniensis* Davenp.) of this species, and in several of its very numerous forms is occasionally found under cultivation.

4. **Nephrolepis rivularis** (Vahl) Mett.; Bot. Jahrb. Engler 24: 122. 1897.

Polypodium rivulare Vahl, *Eclog. Amer.* 3: 51. 1807.

Aspidium sesquipedale Willd. *Sp. Pl.* 5: 230. 1810.

? *Aspidium nigropunctatum* Spreng. Neu. Entd. 3: 7. 1822.
Nephrolepis sesquipedalis Presl, Tent. Pter. 79. 1836.

Rhizome erect, densely clothed with lance-attenuate, laxly ciliate, castaneous scales and bearing numerous long, brown, lustrous, superficial stolons. Fronds erect-spreading, 0.6–2 m. long, the stipes short, stout, brown, deciduously paleaceous; blades linear, 0.5–1.4 m. long, 5–12 cm. broad, slightly narrowed downward, the rachis brown, subpersistently fibrillose-paleaceous; pinnae numerous, horizontal, close or slightly apart (rarely subimbricate at base), subfalcate, linear to linear-oblong, 2.5–6 cm. long, 6–11 mm. broad at middle, narrowed in the outer half or third to an acutish apex, subrectangular at base, acutely short-auriculate above, narrowly convex-cuneate below, the inner margin truncate and parallel to the rachis; margins singly or doubly crenate-serrate above the middle, distantly appressed-serrulate below; leaf-tissue rigidly herbaceous, sparsely and minutely appressed-squamulose; veins very oblique, partially immersed, elevated at base; sori strongly supramedial; indusia orbicular, attached at the end of the linear sinus, facing the margin, the sporangia spreading on all sides.

Rocky banks and tree trunks, at middle and higher elevations, Porto Rico; Tortola; St. Thomas;—Jamaica; Cuba; Hispaniola; Saba; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad; Tobago. Southern Mexico to Brazil.

5. ***Nephrolepis biserrata*** (Sw.) Schott, Gen. Fil. under *pl.* 3. 1834.

Aspidium biserratum Sw. Journ. Bot. Schrad. 1800²: 32. 1801.
Lepidoneuron distans Fée, Gen. Fil. 302. 1852.

Rhizomes erect, 15–25 cm. long, stout, densely clothed with lance-attenuate, light castaneous, lustrous scales, freely stoloniferous. Fronds wide-spreading or recumbent, 1–5 m. long, the stipes short, stout, angulate, pale brown, lustrous, laxly filiform-paleaceous at base, deciduously so above; blades linear-oblong to broadly linear, 0.7–4 m. long, 15–40 cm. broad, slightly narrowed at base, the rachis stout, pale brown, lustrous, finely fibrillose-paleaceous; pinnae numerous, subdistant, spreading, petiolulate, linear-attenuate, 8–20 cm. long, 1.2–2.5 cm. broad, often subcaudate at apex, roundish-truncate or broadly cuneate at base, or sometimes rounded-auriculate at one or both sides; margins variable, finely dentate-serrulate in sterile pinnae, curvessent-serrate to crenate in fully fertile ones, the crenations often minutely toothed; leaf-tissue membrano-herbaceous, translucent, finely whitish-hirtellous beneath; veins 2–4 times forked, 2–4 sterile branches running to each crenation; sori subdistant, intramarginal; indusia orbicular, centrally peltate at the end of the linear sinus, small, the sporangia spreading on all sides.

Tree trunks and brushy banks in partial shade, at lower and middle elevations, Porto Rico; St. Croix; St. Thomas (?);—Jamaica; Cuba; Bahamas; Hispaniola; Guadeloupe; Dominica; Montserrat; Martinique; Grenada; Trinidad; Tobago. Florida; Mexico to Peru and southern Brazil. Widely distributed in the Old World tropics.

44. **SPHENOMERIS** Maxon, Journ. Wash. Acad. Sci. 3: 144. 1913.

Terrestrial ferns of small or medium size, the rhizomes slender, creeping, densely clothed with dark, septate, flattish hairs. Fronds erect or ascending, dorsal, not jointed to the rhizome; blades 3 or 4 times obliquely pinnate or pinatifid, the ultimate segments alternate, narrowly cuneate, truncate; veins few, very oblique, free. Sori borne at or near the distal margin of the segments, single or 2–4 joined. Indusia flattish, pocket-like, herbaceous, attached at the base and sides, single at the clavate apices of the veins or, if joined, borne upon a common transverse receptacle. (Greek, referring to the cuneate segments.) Species several, chiefly East Indian. Type species: *Adiantum clavatum* L.

1. **Sphenomeris clavata** (L.) Maxon, Journ. Wash. Acad. Sci. 3: 144. 1913.*Adiantum clavatum* L. Sp. Pl. 1096. 1753.*Davallia clavata* J. E. Smith, Mém. Acad. Turin 5: 415. 1793.*Stenoloma clavatum* Fée, Gen. Fil. 330. 1852.*Lindsaya clavata* Mett. Ann. Sci. Nat. IV. Bot. 15: 64. 1861.*Odontosoria clavata* J. Smith, Hist. Fil. 264. 1875.*Schizoloma clavatum* Kuhn, Gruppe Chaetopt. 26. 1882.

Fronds numerous, usually close, 20–60 cm. long, the stipes slender, mostly shorter than the blades, stramineous from a darker base, lustrous, firm, glabrous; blades deltoid-ovate to linear-oblong, 10–35 cm. long, 3–15 cm. broad, 3–4-pinnate, the rachises slender, stramineous, subflexuous; pinnules very oblique, distant, the ultimate divisions few, distant, alternate, linear-cuneate, mostly 10–15 mm. long, 1–4 mm. broad at apex, the sides entire, the truncate apex sharply fimbriate-dentate if sterile; sori borne at the clavate vein-ends, solitary or 2–4 confluent, the indusium erose-denticulate. Leaf-tissue light green, thin-char-taceous, glabrous.

Rocky banks and cliffs in partial shade, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Bahamas; Hispaniola. Florida. Attributed also to St. Thomas.

45. **ODONTOSORIA** (Presl) Fée, Gen. Fil. 325. 1852.

Rhizomes slender, woody, wide-creeping, densely subulate-paleaceous. Fronds mostly large, scandent, indeterminate, the primary pinnae opposite, borne in acropetal succession; blades elongate-deltoid to linear, 2–4-pinnate, the ultimate pinnules small, variously lobed, cleft, or parted; rachises woody, mostly flexuous and spiny. Sori terminal, more or less endophyllous; indusium wholly joined to the opposed herbaceous leaf lobule, thus forming an urceolate involucre open distally, or in some species partially free laterally, the involucre then slightly 2-lobate. Spores triplanate. (Greek, alluding to the position of the sori on marginal teeth or lobules.) Species 10, all tropical American. Type species: *Davallia uncinella* Kunze.

Blades 3-pinnate, the slender rachises armed with a few, short, distant, hamate spines; secondary pinnae few, narrowly linear, subequal; segments spongiose-coriaceous.

Blades 4-pinnate, the rachises stout, armed with numerous long, spreading, acicular spines; secondary pinnae numerous, broad, very unequal; segments herbaceous.

1. *O. uncinella*.2. *O. aculeata*.1. **Odontosoria uncinella** (Kunze) Fée, Gen. Fil. 326. 1852.*Davallia uncinella* Kunze, Bot. Zeit. 8: 213. 1850.*Microlepia uncinella* Mett. Fil. Hort. Lips. 103. 1856.*Lindsaya uncinella* Krug, Bot. Jahrb. Engler 24: 92. 1897.

Blades about 1 m. long, 3-pinnate, the primary rachis sinuous, 0.5–1.5 mm. thick, stramineous to light reddish-brown, lustrous, distantly aculeolate; primary pinnae in several distant pairs, laxly spreading or drooping, 15–40 cm. long, the rachis retrorsely short-aculeate, occasionally subtended by a few reduced segments; secondary pinnae 1–4 subequal pairs and a greatly elongate conform terminal one, narrowly linear, mostly 8–40 cm. long, 1–2 cm. broad, distant, divaricate, simply pinnate throughout; segments horizontal or retrorse, adjacent, rounded-trapeziform to obliquely ovate-oblong or deltoid-ovate, the outer margins lightly crenate, or the larger basal segments sometimes pinnately parted; sori numerous, small, close, endophyllous. Leaf-tissue spongiose-coriaceous, wholly concealing the veins, glabrous.

Forest borders and thickets, at middle and higher elevations, Porto Rico:—Cuba; Hispaniola. Ascribed also to St. Vincent.

2. **Odontosoria aculeata** (L.) J. Smith, Cult. Ferns 67. 1857.

Adiantum aculeatum L. Sp. Pl. 1096. 1753, in greater part.

Davallia aculeata J. E. Smith, Mém. Acad. Turin 5: 415. 1793, in part.

Davallia dumosa Sw. Syn. Fil. 135, 353. 1806.

Lindsayopsis aculeata Kuhn, Gruppe Chaetopt. 27. 1882.

Blades 1-2 m. long, 4-pinnate, the primary rachis 1.5-4 mm. thick, light brownish to dull castaneous, freely armed with straight acicular spines (2-4 mm. long); primary pinnae in numerous adjacent pairs, rigidly divaricate, 20-45 cm. long, mostly ovate-deltoid, abruptly reduced at base, evenly narrowed from above the base to the acute apex, the rachis strongly flexuous, together with the tertiary and quaternary rachises freely armed with spreading acicular spines; secondary pinnae numerous, close, spreading, alternate or subopposite, very unequal, those just above the basal pair the largest, deltoid-oblong to ovate-deltoid, 5-15 cm. long, 2-12 cm. broad, the tertiary pinnae spreading or retrorse, gradually shorter toward the apex; pinnules (4th order) irregularly rhombic, consisting of 2-4 cuneate-deltoid segments, these sharply cleft at middle, each lobe emarginate and 2-soriolate. Leaf-tissue herbaceous, the course of the veins usually evident.

Sunny slopes, thickets, and forest borders, at lower and middle elevations, Porto Rico; St. Thomas; Tortola:—Cuba; Hispaniola.

Lax, juvenile plants were listed from Porto Rico by Urban as *O. fumarioides* (Sw.) J. Smith, a Jamaican species.

46. **LINDSAEA** Dryand.; J. E. Smith, Mém. Soc. Turin 5: 413. 1793.

Small or medium-sized, mainly terrestrial plants, the rhizomes slender, creeping or scandent, minutely paleaceous. Fronds not jointed to the rhizome, mostly subfasciculate, erect to laxly ascending, the stipes usually long, sulcate-angulate upward, and lustrous. Blades simple to 2-pinnate, the segments mostly dimidiate-oblong, strongly inequilateral, subentire to deeply cleft distally, invariably entire at the proximal margin, the costa (if any) strongly excentric; venation flabellate-dichotomous, free or anastomosing. Sori borne within the distal margins, rarely solitary, usually linear and continuous upon a transverse receptacle connecting the free veinlets or, if interrupted, the veinlets of a marginal lobe. Indusia mostly linear, extrorse, usually shorter than the opposed valvate margin, the latter plane or recurved. (Name in honor of John Lindsay, a Jamaican botanist.) Species about 125, confined to tropical regions. Type species: *Adiantum guianense* Aubl.

Blades simply pinnate, or, if 2-pinnate, the primary pinnae suberect; margins of segments strongly cartilaginous.

Stipes usually much shorter than the blades; segments broadly oblong to roundish-obovate, thick, often rugose, the valvate margin recurved.

Stipes equaling or exceeding the blades; segments oblong, thin-herbaceous, pellucid, the margins usually plane.

Blades usually 2-pinnate, the primary pinnae oblique-spreading; margins of segments faintly cartilaginous.

Segments slightly oblique, the upper ones gradually reduced, finally confluent at the crenate-caudate tip.

Segments larger, horizontal or decurved, the upper ones distinct below the enlarged deltoid-acuminate or subhastate tip.

1. *L. stricta*.

2. *L. portoricensis*.

3. *L. montana*.

4. *L. lancea*.

1. **Lindsaea stricta** (Sw.) Dryand. Trans. Linn. Soc. 3: 42. 1797.

Adiantum strictum Sw. Prodr. 135. 1788.

Lindsaea rigescens Willd. Sp. Pl. 5: 421. 1810.

Lindsaea elegans Hook. Icon. Pl. 1: pl. 98. 1837.

Rhizome short-creeping or thickish and strongly nodose, densely clothed with appressed, curved, thickish, lance-linear, dark castaneous scales. Fronds

several or numerous, subfasciculate, erect, 20–65 cm. long, the stipes very short or sometimes equaling the blades, stramineous from a dark castaneous base or castaneous throughout, lustrous; blades linear and simply pinnate, or often 2-pinnate, 15–45 cm. long, and consisting of 1–3 pairs of suberect lateral pinnae and a similar but longer terminal one, the main rachis stramineous to castaneous, sulcate-marginate above; pinnae narrowly linear, long-attenuate at apex, 10–40 cm. long, 8–20 mm. broad, the secondary rachises like the primary; segments numerous, adjacent to subimbricate, horizontal or deflexed, broadly dimidiate-oblong to roundish-obovate and narrowly cuneate at base, the margins strongly cartilaginous, the outer usually dentate in sterile segments; leaf-tissue thick-herbaceous or coriaceous, often concave beneath and rugose, lustrous; sori continuous, intramarginal; indusium firm, cartilaginous-crenulate, often apparently as long as the rigid, recurved, cartilaginous, repand-crenulate indusiform margin.

Luquillo Mountains, Porto Rico (*Sintensis* 1398; *Wilson* 96):—Jamaica; Trinidad. Mexico; Costa Rica to Bolivia and Brazil. Ascribed also to Cuba and Hispaniola.

Of the two Porto Rican plants listed under this species by Urban, one (*Heller* 1312) is here referred to *L. portoricensis* Desv.; the other (*Blauner* 299) has not been examined.

2. *Lindsaea portoricensis* Desv. Ges. Naturf. Freund. Berlin Mag. 5:326. 1811.

Rhizome firm, short-creeping, 2–3 mm. thick, coarsely rooting beneath, nodose, densely clothed with small, thick, short-acicular, bright castaneous scales. Fronds several, dorsal, close, erect, mostly 0.4–1 m. long, the stipes usually as long as the blades or longer, castaneous from a darker base, lustrous, subterete, lightly marginate anteriorly; blades rarely linear and simply pinnate, or usually 2-pinnate, 20–45 cm. long, and consisting of 1–3 pairs of rigidly ascending or erect lateral pinnae and a similar greatly elongate terminal one, the main rachis castaneous or golden brown, roundish beneath, sulcate-marginate above; pinnae linear, 20–40 cm. long, 2–3 cm. broad, the secondary rachises stramineous to light castaneous, 4-carinate; segments numerous, close, horizontal, mostly 1–1.5 cm. long, 5–8 mm. broad, dimidiate-oblong, roundish or subtruncate at apex, the upper margin curved, the lower straight or decurved, the inner evenly truncate; leaf-tissue thin-herbaceous, pellucid, remotely glandular beneath; sori continuous, intramarginal; indusium whitish, erose-dentate, membranous, half as broad as the lightly cartilaginous, usually plane indusiform margin.

Moist sandy situations, in partial shade, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Trinidad. French Guiana and British Guiana. Perhaps passing into the last preceding species.

3. *Lindsaea montana* Fée, Mém. Foug. 11:17. pl. 6, f. 2. 1866.

Rhizome short-creeping, 2–3 mm. thick, often closely branched, densely clothed with bright castaneous, subulate-attenuate scales. Fronds several, subfasciculate, erect, 40–60 cm. long or more, the stipes longer than the blades, quadrangular-sulcate, yellowish-brown from a lustrous castaneous base; blades 2-pinnate, 15–28 cm. long, 15–30 cm. broad, consisting of 1–3 pairs of ascending or oblique-spreading lateral pinnae and a similar terminal one; pinnae subequal, distant, subopposite or alternate, linear-attenuate, short-stalked, 10–18 cm. long, 2–3 cm. broad; segments numerous, contiguous, slightly oblique, mostly 1–1.5 cm. long, 4–6 mm. broad, dimidiate-oblong from an oblique cuneate base, usually a little narrowed toward the roundish apex, nearly straight below, the upper and outer margins deeply crenate in sterile specimens, subentire or sinuate in fertile ones; upper segments gradually smaller, the uppermost minute, confluent at the crenate-caudate tip; leaf-tissue thin-herbaceous, pellucid; sori submarginal, continuous or subcontinuous; indusium white, membranous, narrow, not quite equaling the opposed margin.

Mountain forests, at middle elevations, Porto Rico:—Guadeloupe; Dominica; Grenada. Ascribed also to Hispaniola, St. Vincent, and the Guianas, to the first, at least, in error. The Porto Rican material was listed by Urban as *L. quadrangularis* Raddi, a continental species.

4. **Lindsaea lancea** (L.) Bedd. Ferns Br. Ind. Suppl. 6. 1876.

Adiantum lancea L. Sp. Pl. ed. 2, 1557. 1763.

Lindsaea trapeziformis Dryand. Trans. Linn. Soc. 3: 42. pl. 9. 1797.

Lindsaea Abbottii Brause, Repert. Nov. Sp. Fedde 18: 245. 1922.

Rhizome creeping, 2–4 mm. thick, often nodose, closely invested with bright castaneous, lustrous, narrowly lance-attenuate scales. Fronds several, close to subdistant, erect, 40–80 cm. long, the stipes as long as the blades or longer, stramineous or olivaceous from a castaneous base, quadrangular-sulcate, firm; blades sometimes linear and simply pinnate, usually 2-pinnate, 20–40 cm. long, 25–45 cm. broad, consisting of 1–5 pairs of oblique-spreading lateral pinnae and a similar terminal one; pinnae subequal, subopposite to alternate, narrowly linear-oblong, 15–28 cm. long, 2.5–4 cm. broad, acuminate at apex, slightly narrowed at the short-stalked base; segments numerous, close, spreading, mostly dimidiate-oblong from a decurved cuneate base, entire, the inner margin truncate and parallel to the rachis, the upper broadly curved outward to the subrectangular proximal side of the roundish or subtruncate apex, the lower margin straight or concave; upper segments slightly reduced, the terminal one enlarged, deltoid-acuminate, subhastate or crenately lobed at base; leaf-tissue thin-herbaceous or subchartaceous, glabrous; sori intramarginal, continuous around the upper and outer margin; indusium very narrow, membranous, entire, greatly exceeded by the entire, plane leaf-margin.

Forests and wooded slopes, at lower and middle elevations, Porto Rico:—Jamaica. Cuba; Hispaniola; Guadeloupe; Dominica; Martinique (?); Grenada; Trinidad; Tobago. Mexico to the Guianas, Brazil, and Bolivia.

47. **SACCOLOMA** Kaulf. Berlin. Jahrb. Pharm. 21: 51. 1820.

Mostly large, terrestrial ferns of wet forests, the rhizomes mainly stout and erect or ascending, rigidly paleaceous. Fronds not jointed to the rhizome, mostly cespitose, suberect, long-stipitate; blades 1–4-pinnate, commonly of a deltoid type, the divisions anadromous; veins free, simple or obliquely branched, prominent. Sori numerous, submarginal, terminal, solitary. Indusia narrowly to broadly cuneate, adherent laterally above the receptacle, weakly convex, shorter than the small, modified or unmodified, basally concave, opposed marginal crenation or lobule. Spores triplanate. (Greek, signifying saccate border, in allusion to the submarginal soral pouches.) Species 7 or 8, natives of the Old and New World tropics. Type species: *Saccoloma elegans* Kaulf.

Blades 2–3-pinnate; sori close, the indusium broadly cuneate, nearly equaling the short, somewhat modified, indusiform marginal lobule.

1. *S. domingense*.

Blades 3–4-pinnate; sori distant, the indusium narrowly cuneate, distinctly shorter than the unaltered opposed margin.

2. *S. inaequale*.

1. **Saccoloma domingense** (Spreng.) Prantl, Arb. Bot. Gart. Breslau 1: 21. 1892.

Polypodium adiantoides Aubl. Pl. Guian. 2: 962. 1775. Not Burm. 1768.

Davallia domingensis Spreng. Anleit. Gewächsh. 3: 149. pl. 4, f. 33. 1804.

Davallia adiantoides Sw. Syn. Fil. 131. 1806.

Dicksonia Plumieri Hook. Sp. Fil. 1: 72. 1844.

Dicksonia Lindeni Hook. loc. cit. pl. 25, B.

Saccoloma adiantoides Mett. Ann. Sci. Nat. IV. Bot. 15: 80. 1861.

Rhizome stout, erect, 15–30 cm. high, clothed with thick, lustrous, dark brown, cordate-oblong scales. Fronds numerous, cespitose, 1.5–2.5 m. long, the stipes stout, appressed-paleaceous at the verrucose, dull castaneous base, naked, smooth, and paler above; blades elongate-deltoid, 1–1.5 m. long, 0.5–1 m. broad at base, here nearly or quite 3-pinnate; pinnae alternate, oblique-spreading, mostly petiolate, the large basal ones up to 60 cm. long and 40 cm.

broad, subdeltoid, inequilateral, the upper ones narrower and simpler, long-acuminate; pinnules alternate, subdistant, the large lower ones petiolate, elongate-deltoid, and fully pinnate at base, the smaller ones lance-attenuate, decurrent, crenate or obtusely lobed; segments variable, mostly large and confluent, acutish to acuminate, only the largest ones free; sori numerous, close; indusia oblique, broadly cuneate, close to the margin, free distally, nearly equaling the short, broad, modified marginal lobule, this truncate and deeply concave.

Mountain forests, near Utuado and Adjuntas, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Martinique. Colombia and Venezuela. Reported from Trinidad.

2. **Saccoloma inaequale** (Kunze) Mett. Ann. Sci. Nat. IV. Bot. 15: 80. 1861.

Davallia inaequalis Kunze, Linnaea 9: 87. 1834.

Microlepia Galeottii Fée, Gen. Fil. 327. 1852.

? *Microlepia caudata* Fée, loc. cit.

Rhizome erect, stoutish, the apex clothed with thick, dark castaneous, lance-attenuate scales. Fronds several, cespitose, suberect, 1–2 m. long or more, the stipes stoutish, castaneous and deciduously paleaceous toward the base, paler above; blades nearly deltoid, 0.6–1 m. long, 40–90 cm. broad, 3–4-pinnate, the rachises firm, subterete, olivaceous to stramineous, glabrate; pinnae alternate, oblique-spreading, petiolate, the large basal ones deltoid, inequilateral, 25–50 cm. long, 15–35 cm. broad at base, acuminate; upper pinnae gradually smaller and narrower, mostly lance-deltoid, adjacent; secondary pinnae, pinnules, and segments strongly anadromous, stalked, the distal basal ones much larger than the proximal; segments oblique, subdistant, variable, lance-deltoid to obliquely oblong or ovate-oblong, mostly 1–2 cm. long, crenate-serrate to obliquely lobed, sessile, or the upper adnate-decurrent; sori distant; indusia narrowly cuneate, free only at the truncate apex, distinctly shorter than the unmodified leaf-margin.

Mountain forests, at middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Martinique; Trinidad. Mexico to northern South America. Reported from Dominica.

48. **DENNSTAETIA** Bernh. Journ. Bot. Schrad. 1800²: 124. 1801.

Large or medium-sized terrestrial ferns of wet shady slopes or forest borders, the rhizomes slender, creeping, densely hairy. Fronds not jointed to the rhizome, distichous, subdistant, long-stipitate, devoid of scales; blades ample, mostly elongate-deltoid, 2–4-pinnate, the ultimate segments variously incised or sinuate-lobate; veins anadromous, free, simple or pinnately branched, often prominent. Sori numerous, marginal, terminal, solitary, mostly distant. Indusium extrorse, convex, adnate to the lateral margins of a subequal, similarly modified, concave, usually recurved leaf-lobule, the soral pouch thus formed shallowly to deeply cyathiform, even-margined or shallowly bilobed; receptacle punctiform or transversely oblong; spores triplanate. (Name in honor of August Wilhelm Dennstädt, a German botanist.) Species about 75, chiefly of tropical regions. Type species: *Trichomanes flaccidum* Forst.

Blades essentially 3-pinnate, the ultimate divisions relatively coarse.

Pinnae and pinnules sessile; rachises and costae closely crispate-puberulent; veins prominent above; sori small.

Pinnae and pinnules stalked; rachises and costae laxly hirsute or hirtellous; veins prominent beneath; sori large.

Blades ovate, 0.8–1.2 m. broad; leaf-tissue membranous-herbaceous, bright green, lustrous, glabrous.

Blades deltoid, 1.4–2 m. broad; leaf-tissue soft-herbaceous, yellowish green, laxly brownish-hirsute beneath.

Blades essentially 4-pinnate, the ultimate divisions minute.

Sori about 0.3 mm. thick, usually solitary in all but the largest segments; leaf-tissue glabrous.

Sori 0.5–0.9 mm. thick, usually several to a segment; leaf-tissue freely hirtellous beneath.

1. *D. ordinata*.

2. *D. adiantoides*.

3. *D. globulifera*.

4. *D. cicutaria*.

5. *D. rubiginosa*.

1. *Dennstaedtia ordinata* (Kaulf.) Moore, Ind. Fil. 306. 1857.

Dicksonia ordinata Kaulf. Enum. Fil. 226. 1824; Kunze, Farrnkr. 2: 14. pl. 106. 1848.

Stipes 1 m. long or less, rather slender, brownish, deciduously short-puberulous, smooth; blades deltoid, acuminate, 1–1.5 m. long and broad, essentially 3-pinnate, the primary and secondary rachises like the stipe; pinnae opposite throughout, spreading, subsessile, mostly linear-oblong, the basal ones relatively broader, 50–75 cm. long, 20–25 cm. broad, long-acuminate; secondary pinnae spreading, sessile, usually contiguous, linear-oblong, acuminate, attenuate-caudate, 10–14 cm. long, 2.5–4 cm. broad; pinnules spreading, usually close, trapezio-oblong, rounded-obtuse or truncate at apex, 5–9 mm. broad, auriculate-truncate at upper base, cuneate below, slightly adnate, obscurely decurrent (the tertiary rachis very narrowly alate), inciso-dentate to deeply pinnatifid, the broad apex dentate-crenate; lobes or segments 3–5 pairs, oblique-spreading, the basal ones largest, broadly oblong if sterile, the others gradually shorter, mostly subfalcate-truncate, oblong to linear-oblong, emarginate-dentate at apex, mostly monosorous above the oblique distal sinus; tertiary rachis and costae closely crispate-puberulent beneath; veins pinnately branched, prominent above; leaf-tissue herbaceous, dull dark green, glabrous above, scantily appressed-glandular-puberulent beneath; sori globose, 0.7–1 mm. thick, nearly vertical, the soral pouch deeply cyathiform.

Shady mountain ravines, at middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Martinique; Trinidad; Tobago. Costa Rica to northern South America.

Listed from Porto Rico by Urban, on numerous Sintenis specimens, as *Dennstaedtia dissecta* (Sw.) Moore, which was originally described from Jamaica as *Dicksonia dissecta* Sw., an invalid name. This Jamaican plant, which occurs also on the continent from Guatemala to Bolivia and Brazil, should be known apparently as *Dennstaedtia cornuta* (Kaulf.) Moore.

2. *Dennstaedtia adiantoides* (Humb. & Bonpl.) Moore, Ind. Fil. xcvi. 1857.

Dicksonia adiantoides Humb. & Bonpl.; Willd. Sp. Pl. 5: 488. 1810, excl. syn.

Dicksonia apiifolia Hook. Sp. Fil. 1: 77. pl. 26, C. 1844. Not Sw. 1801.

Stipe 1 m. long or often less, slender, bright brown, lustrous, laxly brown-hirsute at base, brownish-hirtellous upward, glabrescent, subscabrous; blades broadly ovate, acuminate, 1–1.4 m. long, 0.8–1.2 m. broad, essentially 3-pinnate, the primary and secondary rachises yellowish brown to stramineous, sulcate above, deciduously brown-hirtellous, subscabrous; pinnae few, oblique, alternate (basal ones excepted), stalked (2–4 cm.), mostly linear-oblong, those of the lower middle portion the longest, 40–60 cm. long, 18–25 cm. broad, broadly oblong, acuminate-attenuate; secondary pinnae alternate, subdistant, spreading, stalked (3–8 mm.), deltoid-oblong, acuminate-attenuate, mostly 10–14 cm. long, 3–4 cm. broad; pinnules oblique-spreading, adjacent or subdistant, alternate, obliquely oblong or deltoid-oblong, roundish at apex, truncate-auriculate at upper base, narrowly cuneate below, the distal basal ones largest (1.5–2.5 cm. long, 8–15 mm. broad), all subsessile, very narrowly joined, coarsely and obliquely inciso-pinnatifid, the broad apex deeply dentate; segments or lobes 3 or 4 pairs, the distal basal one largest, obovate-oblong, cuneate, sometimes subsessile, dentate at the subtruncate apex, obliquely lobed at distal margin, the lobes monosorous just above the narrow sinus; costae and veins bearing a few weak, yellowish brown; deciduous hairs beneath; veins pinnately branched, prominent beneath; leaf-tissue membranous-herbaceous, bright green, highly lustrous; sori cylindric-globose, 0.8–1.2 mm. thick, vertical, the soral pouch deeply cyathiform.

Shady ravines and forest borders, at middle elevations, Porto Rico:—Cuba; Hispaniola; Trinidad. Guatemala to Venezuela and Bolivia.

3. *Dennstaedtia globulifera* (Poir.) Hieron. Bot. Jahrb. Engler 34: 455. 1904.

Polypodium globuliferum Poir. in Lam. Encycl. 5: 554. 1804.

Dicksonia altissima J. E. Smith in Rees, Cycl. 11: *Dicksonia* no. 5. 1808.

Dicksonia exaltata Kunze, Bot. Zeit. 8: 59. 1850.

Dennstaedtia exaltata Hieron. op. cit. 454.

Stipes stout, 1 m. long or more, bright yellow-brown, lustrous, finely puberulous, at length scabrous; blades deltoid, 1.4–2 m. long and broad, coarsely 3-pinnate, the tertiary divisions crenately lobed or parted; basal pinnae petiolate, subovate, acuminate, 0.7–1 m. long, 30–40 cm. broad, the rachis yellowish brown, obtusely ridged above, beset with brownish septate hairs, glabrescent and scabrous beneath; secondary pinnae laxly spreading, linear-oblong to subdeltoid-oblong, petiolate, long-acuminate, the larger ones 12–20 cm. long, 3–6 cm. broad; pinnules subdistant, laxly spreading, 1.5–3.5 cm. long, 7–15 mm. broad, obliquely oblong or ovate-oblong, subauriculate, acutish or mostly roundish-obtuse at apex, subsessile or the middle and outer ones deeply constricted and joined by a broadening foliaceous wing; larger lobes or segments 4 or 5 pairs, trapezio-ovate to roundish-oblong, rounded-obtuse or subtruncate, lightly and broadly dentate, monosorous at distal sinus; veins pinnately branched, strongly elevated beneath; leaf-tissue soft-herbaceous, yellowish green, glabrous above, together with the veins, costules, and costae freely beset with long, subflexuous, spreading, yellowish brown hairs beneath; sori globose, mostly 1.2–1.5 mm. thick, vertical, the soral pouch deeply cyathiform.

Moist thickets, Finca Alvarez, Quebradillas, Porto Rico (*Hioram* 256):—Jamaica; Cuba; Hispaniola. Mexico to Venezuela.

4. *Dennstaedtia cicutaria* (Sw.) Moore, Ind. Fil. xcvi. 1857.

Dicksonia cicutaria Sw. Journ. Bot. Schrad. 1800²: 91. 1801; Fl. Ind. Occ. 3: 1695. 1806, excl. plates cited.

Dicksonia rubiginosa Jenman, Bull. Bot. Dept. Jamaica 22: 11. 1891. Not Kaulf. 1824.

Stipes about 1 m. long, 1 cm. thick, dull yellowish brown, minutely puberulous, glabrescent, with numerous wiry prop-roots; blades deltoid, acuminate, 1–1.5 m. long, 1.2–2 m. broad, essentially 4-pinnate and again pinnately incised, the ultimate divisions small and delicate; basal pinnae opposite, oblong-ovate, 0.6–1 m. long, 30–50 cm. broad, acuminate, short-stalked, narrowed at upper base, the secondary pinnae strongly anadromous; secondary pinnae numerous, alternate, spreading, linear-oblong, abruptly long-acuminate, short-stalked, the larger ones 15–30 cm. long, 4–9 cm. broad; pinnules close, horizontal, oblong, acutish to acuminate, subsessile, often pinnate at base, at least subpinatisect throughout, the segments oblong from a decurrent cuneate base, 3–7 mm. long, 1–3 mm. broad, very narrowly joined, obliquely and sharply incised (the teeth often bifid); tertiary rachises and costae laxly yellowish-hirsute above, together with the costules (and sometimes the veins) thinly hirtellous beneath; veins very oblique, mostly once forked, translucent, elevated beneath, impressed above; leaf-tissue membrano-herbaceous, light green, lustrous above, glabrous; sori minute (0.3 mm. broad), numerous, usually solitary in all but the largest segments, seated at the distal sinus of the lobes, the soral pouch cyathiform, usually vertical.

Caguas, Porto Rico (*Mr. & Mrs. A. A. Heller* 921):—Jamaica; Cuba. Western Panama to Venezuela. The single Porto Rican specimen (*Sintenis* 2711) so cited by Urban is *D. rubiginosa* (Kaulf.) Moore.

The name *Dicksonia cicutaria* Sw. has been very loosely and widely applied, most commonly perhaps to the species here called *Dennstaedtia ordinata*. It is identified with the present plant on the basis of Swartz' type specimen (of which a portion has been deposited in the National Herbarium) and the original description, which includes a highly suggestive comparison with *Dryopteris effusa*. *Dennstaedtia cicutaria* is abundant at middle elevations in Jamaica, whence it was briefly redescribed by Jenman as *Dicksonia rubiginosa*. It is closely related, apparently, only to *Dennstaedtia rubiginosa*, with which it may readily be confused in gross characters.

5. *Dennstaedtia rubiginosa* (Kaulf.) Moore, Ind. Fil. xcvi. 1857.

Dicksonia rubiginosa Kaulf. Enum. Fil. 226. 1824.

Sitotobium rubiginosum J. Smith, Lond. Journ. Bot. 1: 434. 1842.

Dicksonia umbrosa Liebm. Dansk. Vid. Selsk. Skrift. V. 1: 262. 1849.

Stipes 1 m. long or more, yellowish brown, deciduously short-puberulous;

blades deltoid, short-acuminate, 1.5–2.5 m. broad, nearly as long, essentially 4-pinnate and again pinnately incised at base; basal pinnae opposite, oblong-ovate, 0.7–1.25 m. long, 40–60 cm. broad, short-stalked, narrowed above; secondary pinnae strongly anadromous, numerous, spreading, linear-oblong, acuminate, short-stalked, the larger ones 20–35 cm. long, 6–10 cm. broad; pinnules approximate, spreading, oblong, acutish to long-acuminate, sessile or short-stalked, nearly or quite pinnate at base, subpinnatisect elsewhere, the segments slightly oblique, oblong from a short-decurrent cuneate base, 4–9 mm. long, 2–4 mm. broad, narrowly joined, crenate-serrate to pinnately incised, the lobes subacutely toothed; rachises and costae laxly yellowish-hirsute above; costules, veins, and membranous herbaceous leaf-tissue freely yellowish-hirtellous beneath, more scantily so above; veins often pinnately branched within the lobes, oblique, translucent, elevated beneath, sharply impressed above; sori numerous, 0.5–0.9 mm. broad, usually several to a segment, borne at or near the lobe sinuses, the soral pouch shallowly cyathiform or pateriform, fragile.

Forest borders and half-shaded banks, at lower and middle elevations, Porto Rico:—Cuba; Hispaniola. Mexico to Brazil and Bolivia. Porto Rican specimens (*Sintenis 2711*) were listed by Urban as *D. cicutaria* (Sw.) Moore.

Family 7. HYMENOPHYLLACEAE.

Mainly delicate epiphytic plants of moist forests, with slender, wide-creeping, intricate, radiculose or hirsute rhizomes, or a few terrestrial, the rhizomes short-creeping to erect, often with prop-roots. Fronds sessile or stipitate, in epiphytic species mostly distant in attachment, laxly ascending to pendent and widely imbricate, in terrestrial mostly fasciculate and erect or rigidly ascending. Blades roundish and entire to 4-pinnate and of various shape, commonly 1–3-pinnatifid or subpinnatisect (the rachises alate), glabrous to densely hairy, the segments toothed or entire, hygroscopic; venation flabellate or mostly pinnate, the veins joined in a few species. Leaf-tissue usually membranous and pellucid, mostly 1 cell thick, devoid of stomata, the cells hexagonal, completely or only laterally chlorophyllose. Sori marginal; indusia tubular to broadly salverform or bivalvular, herbaceous, immersed to short-stalked, the receptacle filiform or clavate, continuous with the costa. Sporangia basipetal, sessile, obovoid or turbinate, with a complete oblique or horizontal annulus, rupturing vertically; spores triplanate. Prothallia green, mostly filamentous, monoecious. Genera 2, embracing upward of 500 variable species of wide distribution, chiefly of tropical and subtropical regions.

Indusium narrowly tubular-cuneate to salverform, truncate and entire at mouth, or the limb (if developed) shallowly to deeply bilobed; receptacle filiform, usually long-exserted.

Indusia purselike, orbicular to triangular-ovate, bifid or very deeply bilobed, the lobes large, free above the truncate or broadly cuneate base, a tube rarely developed; receptacle filiform or clavate, usually included, often deeply so.

1. *Trichomanes*.

2. *Hymenophyllum*.

1. TRICHOMANES L. Sp. Pl. 1097. 1753.

Plants commonly intricate and minute (the rhizome filiform) or sometimes scandent, with distant fronds, or rarely terrestrial, the rhizome then short-creeping to erect, with fasciculate fronds and strong wiry roots. Fronds numerous, erect to pendent and imbricate, mostly conform, subsessile to long-stipitate; blades minute, orbicular, entire, and usually flabellate-veined to elongate and several times pinnatifid to pinnate, glabrous, glandular, or variously hirsute, the hairs simple, furcate, or stellate, borne mostly at the margins and on the vascular parts; ultimate segments oblong to linear or (rarely) capillary,

mostly adnate and decurrently joined, usually entire, truncate or emarginate at apex. Indusium immersed or wholly free, tubular, narrowly cylindric-cuneate to salverform, truncate and entire at mouth, or the limb (if developed) shallowly to deeply bilobed; receptacle filiform, usually long-exserted with age. (Greek, signifying soft hairs, in allusion to the vestiture). Species about 250. Type species: *Trichomanes crispum* L.

A. Indusia ending abruptly in two large, roundish, dark-marginate lips; margins of blades furnished with stiff, dark, recurved-stellate hairs.

1. Fronds 1-2 cm. long, the blades entire to coarsely lobed or pinnatifid.

a. Costa either wholly wanting or not extending beyond the middle, the venation flabellate.

*Veinlets delicate, slightly or not at all enlarged toward apex.

Costa extending to about the middle in larger blades; veins subequal, those of the lobes slightly thicker, the branches numerous, close, uniform; indusia mostly immersed halfway.

Costa wanting; veins unequal, those of the crenations or lobes obviously heavier, the branches few, subdistant, of unequal thickness; indusia almost wholly exserted.

**Veinlets very thick, evenly enlarged to the broad truncate tips, the interspaces very narrow.

b. Costa percurrent, the venation distinctly pinnate.

2. Fronds 2-6 cm. long; blades subpinnatisect, the pinnae lobed or pinnatifid.

B. Indusia expanded at mouth or not, the limb (if developed) entire or shallowly bilobed, not dark-marginate; marginal hairs, if present, not dark and rigidly recurved-stellate.

1. Costa wanting, the venation flabellate; marginal interspaces bearing each a pair of opposed suborbicular sessile membranous squamules.

2. Costa present, forming a well-defined midrib, the venation 1-4-pinnate; marginal squamules wanting.

a. Veins transversely joined, at least near the margin. Blades subentire to crenately lobed, not viviparous; veins excurrent to a continuous submarginal veinlet, otherwise free.

Blades pinnate, many of them flagellate-radicant at apex; veins joined by numerous transverse veinlets.

b. Veins wholly free.

*Blades sinuate-lobate to pinnatisect, the primary segments (if developed) subentire to pinnately lobed or subpinnatisect.

†Rhizomes filiform, wide-creeping, the fronds distant.

††Rhizomes short-creeping to erect, the fronds cespitose.

‡Fronds rigidly erect, the blades rounded-obtuse at apex, rigidly herbaceous.

‡‡Fronds ascending, the blades long-acuminate or attenuate upward, membranous, pellucid.

Pinnae oblong, rounded at apex, subentire to erose-crenate, often crispate; margins and vascular parts bearing many stiff simple rusty hairs; indusia cylindric-cuneate.

Pinnae lance-oblong to ovate-lanceolate, long-acuminate or attenuate, obliquely lobed or subpinnatisect; margins and vascular parts laxly clothed with delicate 1-2-forked fulvous hairs; indusia urceolate-cuneate.

**Blades variously 3-4-pinnatifid to 3-4-pinnate.

†Rhizome short-creeping or ascending, the fronds imbricate-cespitose.

††Rhizome wide-creeping, the fronds mostly distant.

‡Plants terrestrial, with numerous thick prop-roots; fronds rigidly erect, very elastic.

1. *T. sphenoides*.

2. *T. punctatum*.

3. *T. lineolatum*.

4. *T. pusillum*.

5. *T. Krausii*.

6. *T. membranaceum*.

7. *T. Hookeri*.

8. *T. pinnatum*.

9. *T. polypodioides*.

10. *T. holopterum*.

11. *T. crispum*.

12. *T. alatum*.

13. *T. rigidum*.

13. *T. rigidum*.

††Plants epiphytic, coarse roots wanting; fronds spreading or laxly decurved, not elastic.

§Rhizomes 1-2 mm. thick, woody; fronds mostly 20-50 cm. long.

Blades 3 or 4 times subpinnatisect, all the rachises narrowly alate, glabrous; leaf-tissue opaque, dark green or blackish in drying; indusia narrowly cylindric-cuneate, nearly free.

14. *T. radicans*.

Blades essentially 3-pinnate, only the tertiary rachises narrowly alate; margins, veins, and rachises freely clothed with stiff oblique rusty hairs; leaf-tissue diaphanous, golden green; indusia funnelform, only the abruptly expanded limb free.

15. *T. scandens*.

§§Rhizome filiform, not woody; fronds mostly 5-20 cm. long.

Blades 3-4-pinnate, the rachises flexuous, all but the ultimate ones terete; segments capillary, 0.1-0.3 mm. broad near the truncate or obtusely emarginate tip; indusia stalked.

16. *T. capillaceum*.

Blades 3-pinnatifid, the rachises subflexuous, alate (or the lower primary rachis marginate only); segments 0.8-1.2 mm. broad, acutely emarginate; indusia distinctly alate.

17. *T. hymenophylloides*.

1. **Trichomanes sphenoides** Kunze, *Linnaea* 9: 102. 1834; *Farrnkr.* 1: 215. *pl.* 88. 1846.

Trichomanes reptans Hook. & Grev. *Icon. Fil.* 1: *pl.* 32. 1829. Not Sw. 1788.

Didymoglossum sphenoides Presl, *Abh. Böhm. Ges. Wiss. V.* 3: 115. 1843.

Didymoglossum Hookeri Presl, *loc. cit.* Not *Trichomanes Hookeri* Presl, *op. cit.* 108.

Plants colonial, scarcely intricate but sometimes forming a thin mat, the rhizomes slender, wide-creeping, densely brown-radiculose, closely adherent. Fronds numerous, the sterile ones sessile or nearly so, roundish or reniform-orbicular, 5-10 (15) mm. broad, entire, with fine flabellate venation, the numerous veinlets close and nearly uniform, or sometimes the larger blades broadly obovate, cuneate at base, with several close, shallow, obtuse lobes, a slightly heavier vein running to each of these; fertile fronds 1-2 cm. long, subsessile to stipitate (1 cm.), the blades broadly oblong-obovate, truncate to concave-cuneate at base, rounded or subtruncate at apex, costate to about the middle, several strong veins running to the apical soriferous lobes, the branches all delicate and uniform; sori 1 to several, the indusia immersed about halfway or (in exceptionally fertile blades) exerted nearly their whole length, the blade sublacerate in drying. Leaf-tissue firmly membranous, dark to bright green, translucent; margins finely and deciduously stellate-ciliate.

Closely creeping on stumps and tree buttresses, in very wet forest ravines at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Guadeloupe. Florida; Panama to French Guiana, Brazil, and Peru.

2. **Trichomanes punctatum** Poir. in *Lam. Encycl.* 8: 64. 1808.

Didymoglossum punctatum Desv. *Mém. Soc. Linn. Paris* 6: 330. 1827.

Didymoglossum laceratum Fée, *Mém. Foug.* 11: 113. *pl.* 32, *f.* 1. 1866.

Trichomanes solitarium Jenman, *Gard. Chron.* III. 16: 592. 1894.

Plants colonial, associated in thin, usually loose mats, the rhizomes filiform, minutely brown-radiculose, wide-creeping, intricate. Fronds numerous, laxly imbricate, 0.5-1.5 cm. (rarely 2 cm.) long, the stipes very short, brown-radiculose; blades variable, the smaller fertile and the young sterile ones usually orbicular-reniform, entire, and subsessile (5-7 mm. long), or rarely linear-oblong,

the larger ones 1-1.5 cm. long, 5-10 mm. broad, suborbicular and coarsely crenate-dentate to obovate-cuneate and obliquely lobed, the lobes few, usually short (1-2 mm. long) and rounded-triangular; costa wanting; venation subflabellate, unequal, larger veins running to the crenations or lobes, the branches rather few, oblique, subdistant, of unequal thickness, the thicker ones slightly broader toward the margin of the blade; sori few, solitary at the acutish or retuse apex, or 2 or 3 borne on short apical lobes, the indusia relatively large, almost wholly exerted (subulate at base). Leaf-tissue membranous, translucent; margins freely stellate-ciliate, entire.

Rocks, logs, and tree buttresses, wet forest ravines, at lower and middle elevations, Porto Rico; Tortola:—Jamaica; Cuba; Guadeloupe; Montserrat; Martinique; St. Vincent; Grenada; Trinidad; Tobago. Venezuela and Brazil.

3. **Trichomanes lineolatum** (v. d. B.) Hook. in Hook. & Baker, Syn. Fil. 73. 1867.

Didymoglossum lineolatum v. d. B. Nederl. Kruidk. Arch. 5³: 136. 1863.

Plants associated in loose mats, the rhizomes capillary, densely blackish-radiculose, wide-creeping, intricate. Fronds numerous, oblique, subimbricate in drying, mostly 1.5-3 cm. long, the stipes often as long as the blades, densely radiculose; blades variable, the smallest ones roundish and sessile (6-8 mm. broad), well developed ones obovate to broadly cuneiform, mostly 1-2 cm. long, 8-15 mm. broad, broadly truncate at apex, evenly long-cuneate at base, coarsely and irregularly lobed or (with age) lacerate, the lobes few, spreading, mostly short (2-5 mm. long, 2-3 mm. broad), obtuse, crenate-dentate; costa wanting, the veins flabellate, very close and oblique, repeatedly forked, the branches equal, very thick, increasing regularly to the broadly truncate marginal tips, usually prominent in drying, the interspaces very narrow; sori few (1-4), solitary on very short apical lobes, the indusia mostly immersed, usually only the roundish lips and the apex of the tube entirely free. Leaf-tissue rigid, herbaceous, dull green, corrugate; margins decidedly stellate-ciliate, erose-denticulate with age.

Mossy rocks, stumps, and tree trunks, in very wet forest ravines at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola. Peninsular Florida. Reported also from Costa Rica and Colombia.

4. **Trichomanes pusillum** Sw. Prodr. 136. 1788; Fl. Ind. Occ. 3: 1729. 1806.

Didymoglossum pusillum Desv. Mém. Soc. Linn. Paris 6: 330. 1827.

Didymoglossum angustifrons Fée, Mém. Foug. 11: 113. pl. 28, f. 5. 1866.

Plants colonial, closely aggregate in a dense mat, the rhizomes capillary, wide-creeping, interlacing, densely brown-radiculose. Fronds numerous, oblique, widely imbricate, mostly 1-2 cm. long, the stipes short, brown-radiculose; blades with percurrent costa, variable, often linear to linear-oblong (1-3 mm. broad), entire or nearly so, rounded-obtuse at apex, attenuate downward (thus subspatulate), or in most fertile fronds and well developed sterile ones the blade narrowly cuneiform and 3-fid at apex to irregularly obovate and coarsely pinnatifid (up to 1 cm. broad), the lobes few (1-4 pairs), oblique, mostly linear-oblong, 3-6 mm. long, about 1 mm. broad, rounded at apex, the lower ones shorter, passing abruptly into the decurrent base; main lobes costate, with numerous, very oblique, branched, lateral veinlets, these straight, parallel, delicate, many of them (including the longer ones) unconnected; sori solitary on the 1-4 attenuate apical lobes, the indusium narrowly alate almost to the large suborbicular lips. Leaf-tissue firmly membranous, finely reticulate, the veins elevated; margins delicately stellate-ciliate.

Mossy tree trunks, Sage Mountain, Tortola (*Fishlock 85a*):—Jamaica; Cuba; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Tobago. Venezuela. Reported from Hispaniola and Trinidad.

5. **Trichomanes Krausii** Hook. & Grev. Icon. Fil. 2: pl. 149. 1831.

Didymoglossum Krausii Presl, Abh. Böhm. Ges. Wis. V. 3: 115. 1843.

Didymoglossum fruticosum Fée, Mém. Foug. 11: 112. pl. 28, f. 3. 1866.

Hemiphlebium Krausii v. d. B.; Prantl, Hym. 46. 1875.

Plants colonial, forming a rather dense mat, the rhizomes slender, fuscous, wide-creeping, flexuous, branched, often intricate, very densely blackish-radiculose. Fronds subdistant in attachment, ascending, mostly 2–6 cm. long, sessile or stipitate (5–15 mm.), the stipe and lower rachis densely radiculose; blades extremely variable, elliptical or broadly oblong to narrowly ovate or obovate, rounded-truncate or abruptly acutish at apex, usually abruptly narrowed at base, 1–2.5 cm. broad near the middle, subpinnatisect, the rachis narrowly alate; pinnae oblique-spreading, unequal, mostly close (the sinuses rounded-oblique, open, with a minute basal tooth), normally oblong or linear, coarsely and obliquely lobed or pinnatifid, the lobes or segments few, linear to oblong, roundish at apex, 1 mm. broad or less, costate, without true lateral veins, or the apical pinnae subentire and similar to the larger segments; false veins few and distant; sori usually several, solitary, terminating the upper and apical pinnae or their lobes; indusia somewhat immersed, at least alate nearly to the expanded suborbicular lips, the receptacle often long-exserted. Leaf-tissue membranous, pellucid; margins distantly ciliate, the short brown hairs geminate or substellate.

Mossy tree trunks and boulders, in moist forests at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Dominica; Martinique; St. Vincent; Grenada; Trinidad. Eastern Guatemala southward sparingly to Bolivia and Brazil, at lower elevations.

6. **Trichomanes membranaceum** L. Sp. Pl. 1097. 1753.

Lecanium membranaceum Presl, Abh. Böhm. Ges. Wiss. V. 3: 104. pl. 1. 1843.

Hemiphlebiium membranaceum Prantl, Hym. 46. 1875.

Plants colonial, intricate, forming dense mats, the rhizomes filiform, wide-creeping, densely fuscous-radiculose. Fronds distant in attachment, widely imbricate in mass, 2–14 cm. long, sessile; blades extremely variable, the smaller ones semicircular to suborbicular or broadly cuneiform, roundish at apex, 2–3 cm. long and broad, the larger ones (4–14 cm. long) mostly elongate, linear to cuneate-oblong, or irregularly obovate and narrowly cuneate, usually rounded or broadly truncate at apex, often coarsely and irregularly lobed or cleft, the margins subentire to deeply toothed; costa wanting; veins flabellate, very numerous, close, repeatedly forked, excurrent to the margin; false veins delicate, elongate, free, parallel, 2 or 3 between the true veins, bearing together at the margin a pair of concave, cordate-orbicular, sessile, opposed, membranous squamules, these closely bordering the younger and smaller blades, deciduous in the larger ones; sori several or numerous, mostly apical, terminating the stronger veins, the indusia narrowly cylindric or linear, immersed except for the very short, broadly crenate, spreading limb; receptacles filiform, greatly exceeding the indusium, very fragile. Leaf-tissue dark cloudy green, membranous in drying, glabrous.

Base of tree trunks, wet rocks, and dripping cliffs, in humid forest ravines at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Lucia; St. Vincent; Grenada; Tobago. Nicaragua to Bolivia and Venezuela.

7. **Trichomanes Hookeri** Presl, Abh. Böhm. Ges. Wiss. V. 3: 108. 1843.

Trichomanes muscoides Hook. & Grev. Icon. Fil. 2: pl. 179. 1830. Not Sw. 1801.

Microgonium Berteroanum Presl, op. cit. 3: 138. pl. 6, B.

Microgonium Hookeri Presl, op. cit. 5: 335. 1848.

Plants colonial, forming large mats, the rhizomes wide-creeping, capillary, intricate, densely brown-radiculose. Fronds very numerous, oblique, imbricate, mostly 2–8 cm. long, the stipe very short (5–10 mm.) or wanting, radiculose; blades variable, linear or lance-elliptic to oblanceolate or cuneate-obovate, 5–15 mm. broad, roundish at apex, long-cuneate at base, costate, undulate to coarsely crenate or (toward the apex) crenately lobed, the lobes oblique, subequal, roundish or submarginate; veins pinnately arranged, oblique, once or twice forked within the lobes, excurrent to a continuous submarginal venule, this bordered by a single or double row of thickened cells; spurious veins numerous, very delicate,

parallel to and mostly equaling the true veins, excurrent to the submarginal venule; sori several (3-8), mostly solitary on the apical lobes; indusia wholly immersed, the tube cylindrical, abruptly and broadly expanded at apex, subventricose. Leaf-tissue bright green, membranous, transparent, reticulate, glabrous.

Base of tree trunks (especially on loose aerial roots) and on damp rocks, in forests at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Martinique; St. Vincent; Grenada; Trinidad. Also Venezuela and French Guiana.

The Lesser Antilles and South American material is small and atypical, and may represent a valid species; *T. Kapplerianum* Sturm and *T. crispulum* v. d. B. must be considered in this connection.

8. **Trichomanes pinnatum** Hedw. Fil. Gen. Sp. pl. 4, f. 1. 1799.

Trichomanes rhizophyllum Cav. Descr. Pl. 279. 1802.

Trichomanes floribundum Humb. & Bonpl.; Willd. Sp. Pl. 5: 505. 1810.

Trichomanes pennatum Kaulf. Enum. Fil. 264. 1824.

Neurophyllum pennatum Presl, Abh. Böhm. Ges. Wiss. V. 3: 111. 1843.

Neurophyllum pinnatum Presl, loc. cit.

Neuromanes Kaulfussii v. d. B. Nederl. Kruidk. Arch. 4: 348. 1859.

Neuromanes Hedwigii v. d. B. loc. cit.

Neuromanes immersum v. d. B. op. cit. 349.

Neurophyllum Hedwigii Fée, Mém. Foug. 11: 104. 1866.

Neurophyllum thecaphyllum Fée, op. cit. 104. pl. 28, f. 1.

Neurophyllum rhizophyllum Fée, op. cit. 105.

Plants terrestrial, the rhizome short-creeping or curved-ascending, woody, nodose, thickly beset with rigid lustrous septate brown hairs at apex, and bearing numerous thick wiry prop-roots; fronds several, subfasciculate, subdimorphous. Fertile fronds erect, mostly 25-60 cm. long, the stipes as long as the blades or much longer, brownish, wiry, deciduously brown-hirsute; blades triangular-oblong to ovate or deltoid-ovate, or (excluding the elongate conform terminal pinna) transversely oblong, mostly 12-30 cm. long, 10-25 cm. broad, pinnate at base, pinnate or pinnatisect upward, the rachis obscurely alate, slightly hirsute; pinnae 3-10 pairs, spreading, subequal, lance-linear or ligulate-attenuate, 5-15 cm. long, 1-2 cm. broad, the basal ones rounded at base, sessile or short-stalked, those above mostly semiadnate below, the uppermost free above, broadly short-decurrent; veins numerous, close, spreading, parallel, simple or 1-2-forked, mostly soriferous, irregularly joined by transverse venules, united at the erose-spinulose margin by a heavy vein; sori occupying both margins, erect, the indusia cylindrical-turbinate, sessile or short-stalked, cartilaginous-marginate to the slightly bilobed mouth; receptacle clavate-filiform, long-exserted. Sterile or slightly fertile fronds short-stipitate, spreading and recurved, the blades mostly oblong, with numerous close pinnae, passing abruptly to a naked flagelliform tip, this 10-75 cm. long, viviparous at intervals; leaf-tissue firm-membranous, transparent, usually lustrous.

Shaded ravine banks and gullies, often with scant moisture, at lower elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Martinique; St. Lucia; St. Vincent; Grenada; Trinidad; Tobago. Mexico to Bolivia and Brazil. Variable.

9. **Trichomanes polypodioides** L. Sp. Pl. 1098. 1753.

Trichomanes sinuosum Rich.; Willd. Sp. Pl. 5: 502. 1810.

Trichomanes quercifolium Desv. Ges. Naturf. Freund. Berlin Mag. 5: 328.

1811. Not Hook. & Grev. 1829.

Trichomanes incisum Kaulf. Enum. Fil. 261. 1824.

Trichomanes Poeppigii Presl, Abh. Böhm. Ges. Wiss. V. 3: 133. 1843.

Trichomanes cognatum Presl, loc. cit.

Trichomanes Ujhelyii Kümmerl. Ann. Mus. Nat. Hung. 10: 540. 1912.

Rhizomes filiform, wide-creeping, flexuous, intricate, rather densely brown-radiculose, glabrescent. Fronds distant, pendent, laxly imbricate, mostly 10-25 cm. long, the stipes short (0.5-5 cm.), delicate, brownish, subterete, glabrate;

blades linear to linear-lanceolate, 1–3.5 cm. broad, coarsely sinuate-lobate to deeply pinnatifid, decurrent at base, the broadly alate rachis and margins throughout furnished with a few distant, short-stalked or sessile, stellate or 2–3-fid, fulvous hairs, the main veins at first similarly hairy beneath and distantly allantoid-glandular; segments oblique, highly variable, the larger middle ones rather close, mostly oblong to broadly oval-oblong, often subtruncate if fertile, 3–7 mm. broad, sinuate to coarsely crenate, pinnately veined; upper and lower segments often reduced, with rounded open sinuses; sori solitary and axillary, or 1–3 pairs in the larger segments, the indusia immersed, salverform, expanded at truncate apex, the filiform receptacles long-exserted. Leaf-tissue membranous, pale green, pellucid, lustrous, glabrous.

Mountain forests, at higher elevations, Porto Rico, on tree ferns and at the base of tree trunks:—Jamaica; Cuba; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad. Mexico to Uruguay and Bolivia.

10. **Trichomanes holopterum** Kunze, Farrnkr. 1: 185. *pl.* 77, *f.* 2. 1845.

Rhizome erect, 5–15 mm. long, 2–5 mm. thick, fuscous-setaceous, with copious wiry roots. Fronds several or numerous, cespitose, rigidly erect, 5–13 cm. long, the stipes one-half to two-thirds as long as the blades or equaling them, dark brown, subterete at extreme base, broadly foliaceous-marginate upward (2–4 mm. broad at summit), deciduously dark-setaceous and bearing a few short turgid glandlike hairs; blades oblong or lance-oblong, 3–8 cm. long, 1.5–3 cm. broad, rounded-obtuse at apex, slightly narrowed at base, coarsely pinnatifid, the rachis very broadly alate, sparsely setulose and glandular; pinnae 5–10 pairs, spreading, mostly close to imbricate, subtrapeziform to broadly oval-oblong, rounded or subtruncate at apex, constricted at base, coarsely sinuate-lobate, the teeth oblique, rounded, simple or the larger ones shallowly bifid, the costa and veins obscurely brownish-setulose, the margins glabrate; sori numerous, mostly terminating the apical and middle pinnae in groups of 2–4; indusia wholly immersed, short, the limb abruptly urceolate, entire; receptacles filiform, long-exserted (5–10 mm.), fragile. Leaf-tissue dark or yellowish green, rigid, lustrous, repand.

Rotten logs and wet humus of deep forest ravines, at middle and higher elevations. Porto Rico:—Jamaica; Cuba; Guadeloupe; Dominica; Martinique; Grenada.

Closely allied to *T. arbuscula* Desv., of which *T. Bancroftii* Hook. & Grev. and *T. coriaceum* Kunze apparently are synonyms.

11. **Trichomanes crispum** L. Sp. Pl. 1097. 1753.

Trichomanes badium Fourn. Bull. Soc. Bot. France 15: 147. 1868.

Rhizome short-creeping to suberect, 5–8 mm. thick, subnodose, densely clothed with long, oblique, rigid, dark brown, lustrous hairs. Fronds numerous, cespitose, ascending, mostly 15–40 cm. long, the stipes usually much shorter than the blades, dark brown, compressed-angulate, not at all alate, laxly clothed with simple, dark ferruginous hairs; blades lance-oblong to narrowly triangular-lanceolate, 10–30 cm. long, 2.5–6 cm. broad, evenly attenuate in the apical half or two-thirds, not or slightly reduced at extreme base, there pinnatisect, subpinnatisect upward, the stout dark rachis thus narrowly alate, together with the costae, veins, and margins throughout rusty-hirsute like the stipe; pinnae numerous, close or imbricate, horizontal, narrowly to broadly oblong, 5–10 mm. broad, usually rounded at apex, subcordate at lower base or constricted on both sides, with strong percurrent median costa, the margins subentire to sinuate-crenate or erose-undulate; veins numerous, oblique, the sterile ones 1–3-forked; sori 1–3 pairs, apical, the indusia cylindric-cuneate, slightly enlarged at apex, up to 3 mm. long, immersed, their own width apart, the interspaces lightly emarginate; receptacles filiform, greatly exserted. Leaf-tissue firmly membranous, pellucid, often crispate or repand, lustrous, glabrous.

Mossy tree trunks, rotten logs, and wet rocky banks in dense mountain forests, at middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Montserrat; Martinique; St. Vincent; Grenada; Trinidad.

Reported from other West Indian islands and from most of continental tropical America. Chiefly from the latter region about 25 segregate species have been proposed, many of which, in the absence of an authoritative review of the group, have received nominal recognition. The type of *T. crispum* is from Martinique, and the above description applies to this common West Indian form, with fasciculate fronds.

12. **Trichomanes alatum** Sw. Journ. Bot. Schrad. 1800²: 17. 1801; Fl. Ind. Occ. 3: 1732. 1806.

Trichomanes attenuatum Hook. Sp. Fil. 1: 122. pl. 39, C. 1844.

Trichomanes ptilodes v. d. B. Nederl. Kruidk. Arch. 4: 357. 1859.

Ptilophyllum attenuatum v. d. B.; Prantl, Hym. 48. 1875.

Ptilophyllum ptilodes v. d. B.; Prantl, loc. cit.

Rhizomes small, erect or oblique, densely clothed with long, stiff, oblique, yellowish brown hairs. Fronds numerous, fasciculate, laxly ascending or recurved, mostly 10–30 cm. long, the stipe usually half or one-third as long as the blade, terete at base, foliaceous-alate at summit or nearly throughout, sometimes widely so (3 mm. broad at apex), laxly clothed with 1–2-forked fulvous hairs; blades lance-oblong to ovate-lanceolate, mostly 7–20 cm. long, 3–7 cm. broad, long-acuminate or attenuate at apex, slightly narrowed at base, subpinnatisect and again obliquely subpinnatisect or pinnately lobed, the primary rachis narrowly and evenly alate, together with the margins and larger veins throughout deciduously hairy like the stipe; pinnae oblong-acuminate to lance-attenuate, mostly adjacent, the larger lobes or segments oblong, coarsely dentate-serrate, pinnately veined; sori solitary, terminating the larger segments of the upper pinnae, the indusia wholly immersed, rather short, urceolate-cuneate, truncate at apex; receptacles very slender and long-exserted. Leaf-tissue yellowish green, membranous, diaphanous, reticulate, lustrous.

Trunks of trees and tree ferns, in wet mountain forests at higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Saba; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad (?). Also, Margarita Island, Venezuela.

Variable and very likely an aggregate. Most of the Lesser Antilles plants are darker, larger, and much more robust than typical material from Jamaica, and have the stipes conspicuously alate nearly to the base.

13. **Trichomanes rigidum** Sw. Prodr. 137. 1788.

Trichomanes compressum Desv. Ges. Naturf. Freund. Berlin Mag. 5: 329. 1811.

Trichomanes mandioccanum Raddi, Pl. Bras. 1: 64. pl. 79, f. 2. 1825.

Trichomanes millefolium Desv. Mém. Soc. Linn. Paris 6: 329. 1827.

Trichomanes firmulum Presl, Abh. Böhm. Ges. Wiss. V. 3: 138. 1843.

Trichomanes daucooides Presl, Epim. Bot. 12. pl. 7. 1851.

Trichomanes Krugii Christ, Bot. Jahrb. Engler 24: 90. 1897.

Terrestrial; rhizomes clothed with long appressed acicular lustrous septate hairs, short-creeping or curved-ascending (the fronds numerous, imbricate-cespitose), or frequently wide-creeping (20 cm.), flexuous, terete, 2–3 mm. thick, the fronds few, subdistant or as much as 15 cm. apart. Fronds rigidly erect, mostly 15–30 cm. long, the stipes as long as the blades or one-half longer, stout, brown, flexuous, deciduously brown-hairy; blades elastic, mostly ovate, acuminate, 8–20 cm. long, 6–15 cm. broad, finely 3–4-pinnate, the primary rachis firm, subterete, lightly marginate, olivaceous or green, glabrescent; pinnae subopposite to alternate, few, close, curved-ascending or spreading, deltoid-ovate to trapezoid-oblong, oblique at proximal base, acuminate at apex; ultimate segments very numerous, linear, mostly 1–2.5 mm. long, 0.3–0.5 mm. broad, simple and acutish, or bifid, the leaf-tissue hygroscopic, often revolute in drying, glabrous; veins elevated above, together with the rachises often coarsely glandular-setulose beneath; sori numerous, subaxillary, the indusia nearly free (greenish-marginate), compressed, narrowly funnelform, truncate and narrowly 2-lipped at apex, not expanded laterally. Leaf-tissue dark green, firm, the cell structure highly variable.

Steep rocky slopes and clayey ravine banks, in humid forests at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Mar-

tinique; Grenada; reported from Barbados. Guatemala to Bolivia and Brazil; also, as usually regarded, tropical and subtropical regions of the Old World.

Here regarded in the conventional sense, in so far as American material is concerned. Several additional names have been applied to the Old World forms.

14. *Trichomanes radicans* Sw. Journ. Bot. Schrad. 1800²: 97. 1801; Fl. Ind. Occ. 3: 1736. 1806.

Trichomanes scandens Hedw. Fil. Gen. Sp. pl. 6. 1799. Not L. 1753.

Trichomanes mexicanum v. d. B. Nederl. Kruidk. Arch. 5²: 164. 1861.

Rhizomes slender (1–2 mm. thick), firm, fuscous, sinuous, wide-creeping, densely blackish-radicleose, closely adherent. Fronds distant, arcuate-spreading, mostly 20–50 cm. long, the stipes stout, much shorter than the blades, dull oliveaceous, greenish-alate upward, sparingly fibrillose; blades lance-oblong to narrowly ovate, 15–40 cm. long, 5–20 cm. broad, mostly long-acuminate at apex and slightly reduced at base, 3–4-subpinnatisect, the rachises all narrowly alate; primary pinnae numerous, mostly subimbricate, laxly ascending, elongate-triangular to deltoid-ovate from a strongly inequilateral base; ultimate segments very numerous, close, linear-oblong, about 1 mm. broad, mostly emarginate or bifid; sori numerous, the indusia narrowly cylindric-cuneate, greenish-marginate and nearly free, or obviously alate at proximal base, not or slightly expanded at apex, the limb (if developed) very narrow and slightly 2-lobed; receptacles filiform, long-exserted, fragile. Leaf-tissue membranous, glabrous, opaque and dark green, often blackish in drying.

Mossy rocks, cliffs, and tree trunks in wet mountain forests, at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Martinique; Montserrat; Grenada. Continental tropical America generally and, as usually understood, western Europe, Africa, Polynesia, and southeastern Asia.

The present collective species is one of the most widely distributed ferns of tropical and subtropical regions and, making all allowance for specifically distinct forms that have been incorrectly included, one of the most variable both regionally and locally. The synonymy and bibliography are extensive. Of the Porto Rican specimens a majority agree with typical material from Hispaniola and Jamaica; but a few, particularly the younger plants, have the stipe and rachis broadly alate and the blades coarsely 3-pinnatifid, the segments broad and few. Similar variations are noted for other regions. Thus, on the continent, a comparatively small Mexican plant has been described as *T. mexicanum* v. d. B., but the commonest form, extending from Mexico to Bolivia, is a large, rather finely dissected plant usually called *T. Kunzeanum* Hook., which in gross characters approaches closely the typical Greater Antilles form. Many other names have been applied to American plants and to related Old World forms from widely remote regions. Only a monographic revision of the group will bring these into their proper relation. The description here given applies primarily to the typical Greater Antilles plant.

15. *Trichomanes scandens* L. Sp. Pl. 1098. 1753.

Trichomanes Lindenii Presl, Epim. Bot. 11. pl. 6. 1851.

Trichomanes macroclados Kunze, Farnkr. 2: 72. pl. 130. 1850.

Rhizomes slender (1–2 mm. thick), woody, brown, sinuous, wide-creeping, freely clothed with stiff, oblique, curved, castaneous hairs, glabrescent with age. Fronds numerous, subdistant, arcuate-spreading, mostly 20–50 cm. long, the stipes mostly one-third or half as long as the blades, slender, light brown, terete, arcuate at base, thinly clothed with oblique rusty hairs; blades oblong-lanceolate to broadly ovate-oblong, 15–40 cm. long, 8–25 cm. broad (or broader in numerous aborted blades), essentially 3-pinnate, the primary and main secondary rachises terete, the tertiary narrowly alate, all the rachises, veins, and leaf-margins freely clothed with long, stiff, slender, oblique, rusty, septate hairs; primary pinnae rather few, laxly ascending (often recurved), short-stalked, trapeziform-oblong to obliquely elongate-deltoid from an unequal base (strongly acroscopic), up to 20 cm. long, usually long-acuminate or attenuate at apex; pinnules oblique, the distal basal ones the largest; tertiary segments oblique, subdistant, narrowly joined, the larger ones rhombic-lanceolate, obliquely lobed or pinnatifid; sori very numerous, the indusia funnelform, immersed, only the short, abruptly expanded, truncate limb free, entire; receptacles filiform, greatly exserted, fragile. Leaf-tissue golden green, delicately membranous, transparent.

On trunks of trees and tree ferns, in wet mountain forests at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola.

16. **Trichomanes capillaceum** L. Sp. Pl. 1099. 1753.

Trichomanes tenellum Hedw. Fil. Gen. Sp. pl. 3, f. 1. 1799.

Trichomanes trichoides Sw. Journ. Bot. Schrad. 1800²: 98. 1801; Syn. Fil. 144. 1806.

Trichomanes trichoides Sw. Fl. Ind. Occ. 3: 1741. 1806.

Trichomanes cuneiforme Schkuhr, Krypt. Gewächse. 1: 131. pl. 134. 1809.

Trichomanes angustissimum Presl, Abh. Böhm. Ges. Wiss. V. 5: 333. 1848; Epim. Bot. 18. pl. 8, A. 1851.

Trichomanes tenuissimum v. d. B. Nederl. Kruidk. Arch. 5²: 156. 1861.

Plants intricate, the rhizomes filiform, wide-creeping, brown, deciduously brownish-radiculose. Fronds numerous, spreading or decurved, subdistant in attachment, mostly 8–20 cm. long, the stipes short (1–5 cm.), terete, light brown, glabrous; blades lance-linear to oblanceolate, or sometimes oblong-lanceolate, 1–6 cm. broad, finely 3–4-pinnate, the rachises green, flexuous, glabrous or obscurely clavate-glandular, all but the ultimate ones terete; pinnae close, often imbricate, oblique-spreading; ultimate segments distant, very narrowly linear-cuneate or filiform, mostly 2–5 mm. long, 0.1–0.3 mm. broad at the truncate or obtusely emarginate tip, delicately unicostate; sori appearing subaxillary, borne chiefly near the main rachises, distant, the indusia large, stalked, narrowly cylindric-cuneate, abruptly and (usually) broadly expanded at apex, the limb subentire; receptacles long-exserted. Leaf-tissue delicately membranous, dull green, glabrous.

Trunks of trees and tree ferns, in humid mountain forests at higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola. Mexico to Venezuela and Ecuador.

17. **Trichomanes hymenophylloides** v. d. B. Nederl. Kruidk. Arch. 5³: 209. 1863.

Trichomanes pyxidiferum Hook. & Grev. Icon. Fil. 2: pl. 206. 1831. Not L. 1753.

Trichomanes leptophyllum v. d. B. Nederl. Kruidk. Arch. 4: 363. 1859. Not Cunn. 1836.

Rhizomes filiform, wide-creeping, flexuous, intricate, minutely brown-radiculose. Fronds numerous, distant in attachment, ascending, mostly 5–15 cm. long, the stipes one-third to two-thirds as long as the blades, slender, subterete and thinly radiculose at base, lightly alate upward (at least at summit); blades oblong to ovate, acute or abruptly acuminate at apex, 3–10 cm. long, 1.5–4 cm. broad, very deeply 3-pinnatifid (the lower pinnae nearly free), the rachis subflexuous, narrowly alate, more broadly so upward, together with minor rachises and veins obscurely glandular-setulose; pinnae alternate, ascending, subdistant, variable, trapeziform to narrowly triangular and attenuate, the pinnules few, subdistant, oblique; segments few, linear, oblique, deeply bifid or simple, acutely emarginate, as broad as the uniformly alate costae and minor rachises (0.8–1.2 mm.); sori few, distant, usually solitary at the distal base of the pinnules and upper pinnae, the indusia large, narrowly cylindric-cuneate, alate (0.8–1.2 mm. broad in all), abruptly expanded at apex, the limb shallowly cyathiform, entire; receptacles long-exserted at maturity. Leaf-tissue membranous, usually light green, glabrous.

On tree ferns, trees, and wet rocks, in dense mountain forests at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad. Mexico to Brazil. Listed by Urban as *T. pyxidiferum* L.

2. **HYMENOPHYLLUM** J. E. Smith, Mém. Acad. Turin 5: 418. 1793.

Delicate epiphytic plants with wide-creeping, filiform, usually intricate, flexuous rhizomes and distant, ascending or flaccid fronds, similar in many re-

spects to *Trichomanes*. Fronds stipitate, the blades variously hairy, suborbicular to linear or deltoid-ovate, 1 to several times pinnatifid or pinnate, the primary rachis terete or commonly foliaceous-alate, the wings and narrow ultimate segments plane or undulate-crispate, entire or frequently serrate. Indusium purse-like, broadly attached at the base of the receptacle, bifid or very deeply bilobed, the opposed lobes orbicular to triangular-ovate, subequal, convex, free; receptacle filiform or clavate, rarely exceeding the indusium, usually much shorter, the sporangia basal or not. (Greek, signifying membranous leaf.) About 275 species. Type species: *Trichomanes tunbridgensis* L.

A. Blades glabrous throughout.

1. Stipes terete, neither marginate nor alate.

Blades coarsely 1-2-pinnatifid, the pinnae often merely digitate-lobate; segments few, about 3 mm. broad, plane.

Blades finely 3-pinnatifid; segments numerous, about 1 mm. broad, together with the wings strongly repand or crispate, crowded.

2. Stipes brownish-marginate upward.

Blades coarsely 2-pinnatifid; segments very few, mostly distal, 1-2 mm. broad.

Blades finely and deeply 3-4-pinnatifid; segments numerous, 1 mm. broad or less.

B. Blades ciliate and otherwise hairy.

1. Stipes terete; primary rachis alate toward the apex only; minor rachises delicately and unevenly alate, glabrous.

2. Stipes conspicuously alate, at least above the middle; primary and minor rachises broadly alate throughout, hairy on one or both sides.

Blades 2-pinnatifid; rachises clothed with furcate-stellate hairs on both sides, the wings and segments freely ciliate with furcate-stellate hairs; indusia orbicular, rigidly stellate-ciliate.

Blades 3-4-pinnatifid; rachises coarsely hairy beneath, glabrous above; wings and segments rigidly appressed-ciliate, the hairs mostly simple; indusia ovate-oblong, acutish, glabrate.

1. *H. asplenioides*.

2. *H. crispum*.

3. *H. macrothecum*.

4. *H. polyanthos*.

5. *H. lineare*.

6. *H. ciliatum*.

7. *H. microcarpum*.

1. **Hymenophyllum asplenioides** Sw. Journ. Bot. Schrad. 1800²: 98. 1801.

Trichomanes asplenioides Sw. Prodr. 136. 1788.

Rhizomes wide-creeping, filiform, light brown, sparingly clothed with deciduous appressed stiffish yellowish hairs. Fronds pendent, imbricate, distant in attachment (1-3 cm.), mostly 8-20 cm. long, the stipes 2-5 cm. long, capillary, yellowish brown, glabrate; blades 5-15 cm. long, 1-3 (rarely 4) cm. broad, glabrous throughout, oblong to ligulate, acutish or usually rounded-obtuse at apex, slightly or not at all reduced at base, here nearly or quite pinnatisect, above deeply and coarsely pinnatifid, the dark brown, flexuous, capillary rachis winged throughout; pinnae oblique or oblique-spreading, alternate, close, nearly uniform, with narrow rounded-obtuse sinuses, decurrent, mostly oblong, coarsely and obliquely pinnatifid or digitate-lobate, the lobes very few, chiefly distal, about 3 mm. broad, entire, those of the distal half or two-thirds mostly fertile, the veins of sterile lobes falling far short of the roundish ends; leaf-tissue bright green, firm, lustrous; indusia suborbicular to roundish-ovate, 2-2.5 mm. broad, somewhat compressed, very deeply bilobed, transversely arcuate at base, entire; receptacle short.

On rotten tree trunks, Maricao, Porto Rico (*Hess 223*):—Jamaica; Cuba; Hispaniola. Guatemala to southern Brazil.

2. **Hymenophyllum crispum** H. B. K. Nov. Gen. & Sp. 1: 26. 1815.

Plants forming dense mats, the rhizomes wide-creeping and interlacing, capillary, subpersistently clothed with spreading flexuous castaneous hairs. Fronds numerous, laxly pendent, subdistant in attachment, long-persistent, densely imbricate, 5-17 cm. long, glabrous throughout, the stipes short, dark brown, dull, terete; blades narrowly oblong to linear, 4-15 cm. long, 0.8-2.5 cm. broad, nearly

of equal width throughout, rounded-acute or subtruncate at apex, pinnate at base, subpinnatisect upward, the dark brown, flexuous, capillary rachis crispate-alate above the base; pinnae numerous, alternate, laxly ascending, subequal (or an occasional one greatly produced), contiguous or imbricate, lance-oblong to deltoid-oblong from an unequal base, usually obtuse, excavate below, decurrent, deeply 2-pinnatifid, the segments oblong, entire, strongly repand or crispate, crowded, often not distinct, as broad as the strongly repand-alate costae (about 1 mm.); veins solitary not reaching the rounded, deeply retuse end of the segments; leaf-tissue bright yellowish green, lustrous; sori abundant, often occupying most of the lobes in the apical half of the blade, the indusia suborbicular, slightly broader than the sterile segment or not, free to the broad, transversely arcuate or truncate base; receptacle short, included.

On rotten tree trunks, at higher elevations, Porto Rico (*Hess 225; Stevens 1977*):—Jamaica; Cuba; Guadeloupe. Mexico to Bolivia. Attributed to *Hispaniola*.

3. **Hymenophyllum macrothecum** Fée, *Mém. Foug.* 11: 115. *pl.* 31, *f.* 2. 1866.

Hymenophyllum vincentinum Baker, *Ann. Bot.* 5: 164. *pl.* 10. 1891.

Plants colonial, the rhizomes capillary and wide-creeping, brownish, wiry, rusty-hairy at the minute nodes, glabrescent. Fronds pendent, mostly distant, 4–20 cm. long, the stipes much shorter than the blades, capillary, brownish, narrowly brownish-marginate upward; blades 3–15 cm. long, 1.5–3.5 cm. broad, narrowly triangular to linear-oblong, abruptly acute or truncate at apex, glabrous throughout, pinnatisect at base, subpinnatisect upward, the slender subflexuous rachis very narrowly alate; pinnae 4–10 pairs, alternate, usually distant, oblique or oblique-spreading, broadly rhombic, 1–2 cm. long, strongly inequilateral, widely excavate below, cuneate-decurrent at base, coarsely and obliquely pinnatifid, the segments few (3–6 per pinna), mostly distal, subdigitate, simple or deeply bifid, linear, as broad as the alate costa (1–2 mm.), entire, the solitary vein falling short of the tapering roundish apex; leaf-tissue dark green, pellucid; sori very few, borne at the apex of the blade, the indusia 2–3 mm. long, oval-ovoid, usually acute at apex, entire, free to the narrowly alate, cuneate basal third, the tube acute and short; receptacle stout, barely or not wholly included.

Trunks of forest trees, Luquillo Mountains and Sierra de Naguabo, Porto Rico, at middle and higher elevations (*Shafer 2257; Sittenis 1748; Hioram 345* in part; *Stevenson 1617*):—Guadeloupe; Montserrat; Grenada; St. Vincent.

4. **Hymenophyllum polyanthos** Sw. *Journ. Bot. Schrad.* 1800²: 102. 1801.

Trichomanes polyanthos Sw. *Prodr.* 137. 1788.

Trichomanes clavatum Sw. *Prodr.* 137. 1788.

Hymenophyllum clavatum Sw. *Journ. Bot. Schrad.* 1800²: 101. 1801.

Rhizomes wide-creeping and interlacing, finely wiry, brownish, flexuous, laxly clothed with oblique castaneous hairs, glabrescent. Fronds laxly ascending or sometimes nearly pendent, 2–10 cm. distant, mostly 8–25 cm. long, the stipes much shorter than the blades, dull brown, wiry, brownish-marginate upward; blades 5–20 cm. long, 2.5–6 cm. broad, glabrous throughout, linear-oblong to deltoid-ovate, acuminate or acute at apex, very deeply 3–4-pinnatifid, the rachis slender, dark brown, flexuous, narrowly foliaceous-marginate throughout; pinnae oblique-spreading, the basal ones sometimes reduced and apart, the others close, alternate, trapezoid-oblong to obliquely deltoid-oblong, subtruncate or acute at apex, the secondary rachises flexuous, foliaceous-marginate, 1 mm. broad or less; pinnules alternate, strongly anadromous, obliquely 1–2-pinnatifid, the segments linear or linear-oblong, close, entire, about 1 mm. broad, the marginate costae equally broad; veins solitary, not quite reaching the roundish-truncate or retuse apex of the segments; leaf-tissue dull green, sublustrous, fragile; sori mostly occupying the apical half of the blade, the indusia rounded-ovate, obtuse or acute at apex, scarcely broader than the sterile segment, compressed, very deeply bilobed, the base broadly cuneate, not forming a tube; receptacle included.

On tree ferns, mossy tree trunks, logs, and less commonly on wet shady rocks, in mountain forests, Porto Rico, at middle and higher elevations:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad. Widely distributed in continental America from Mexico southward, and, as currently understood, in tropical and subtropical portions of the Old World. Variable and polymorphic, the synonymy extensive and difficult. A Sintenis specimen (no. 1748c) listed by Urban as *H. Kohautianum* Presl belongs here.

5. **Hymenophyllum lineare** Sw. Journ. Bot. Schrad. 1800²: 100. 1801; Fl. Ind. Occ. 3: 1749. 1806.

Trichomanes lineare Sw. Prodr. 137. 1788.

Hymenophyllum Catharinae Hook. in Hook. & Baker, Syn. Fil. 67. 1867.

Rhizomes capillary, wide-creeping, thinly clothed with persistent, spreading flexuous, yellowish brown hairs. Fronds usually ascending, distant (2–6 cm.), 5–20 cm. long, the stipes one-third or one-fourth as long as the blades, dark brown, wiry, terete, sparsely clothed with simple, furcate, and substellate, yellowish brown hairs; blades variable, the smaller ones oblong, 4–8 cm. long, 1.5–3 cm. broad, rounded-obtuse or acutish at apex, scarcely reduced at base, the larger ones 8–16 cm. long, 3–5 cm. broad, lanceolate to narrowly oblanceolate, long-acuminate at apex, all the blades pinnate nearly throughout, the slender wiry rachis clothed like the stipe, subflexuous, very narrowly green-alate toward the apex; pinnae laxly oblique or spreading, alternate, adjacent (or the lower ones distant), sessile, rhombic-oblong (excavate below), the smaller ones very deeply pinnatifid, with simple or deeply bifid, linear, rounded-obtuse segments (about 0.5 mm. broad), the larger ones 2-pinnatifid, with narrowly linear segments; costae narrowly alate, the wings often shrunk and unevenly plicate in drying, the vascular parts glabrous; leaf-tissue dark green, distantly ciliate with stiff, oblique, mostly simple hairs; sori numerous, borne mainly in the apical part of the blade, the indusia suborbicular, 1 mm. broad or more, free to the broad subarcuate base, rigidly ciliate with simple hairs; receptacle deeply included.

Mossy trunks of forest trees, at higher elevations, Porto Rico (Wilson 168; E. G. Britton 7681; Chase 6741b):—Jamaica; Cuba; Guadeloupe.

The name *Hymenophyllum lineare* is here restored to its original application, on the basis of Christensen's illustrations of the Swartzian type specimens from Jamaica, *H. Catharinae* Hook. being the exact equivalent. The exceedingly delicate, flaccid Jamaican plant with dense, grayish or tawny, stellate-hairy covering, wrongly referred by Jenman and others to *H. lineare*, is not known to occur in Porto Rico; this is *H. antillense* Jenman, but the earlier name, *H. elegans* Spreng., given originally to continental material, may apply to it also. *H. Urbani* Brause, recently described from Hispaniola, is identical with *H. antillense*.

6. **Hymenophyllum ciliatum** Sw. Journ. Bot. Schrad. 1800²: 100. 1801; Fl. Ind. Occ. 3: 1753. 1806.

Trichomanes ciliatum Sw. Prodr. 136. 1788.

Plants tufted, the filiform rhizomes wide-creeping and entangled, brown, wiry, loosely rusty-hirsute, the hairs simple, flexuous. Fronds numerous, suberect or spreading, distant or subdistant, mostly 3–10 cm. long, the stipes usually short, broadly alate (at least above the middle), the margins conspicuously clothed with coarse furcate-stellate hairs; blades narrowly oblong to deltoid-oblong or subovate, obtuse or acutish at apex, mostly 2.5–8 cm. long, 1–3 cm. broad, deeply 2-pinnatifid, the rachis wiry, freely clothed with coarse, furcate-stellate, yellowish hairs on both sides and along the broad wings, similar hairs borne at the margins of the segments and wings throughout and upon both sides of the costae and costules; pinnae close or approximate, spreading or laxly ascending, oblong to rhombic-deltoid, rounded-obtuse at apex, excised at lower base, deeply and obliquely pinnatifid; pinnules 3–5 pairs, simple, or one or several of the larger ones deeply and acutely bifid, the segments in general few, linear to linear-oblong, 0.5–1 mm. broad, rounded-obtuse at apex, subdenticulate; sori usually occupying the apical portion of the blade, solitary, the indusia large, orbicular, convex, free to the rounded base, rigidly stellate-ciliate like the sterile segments; receptacle included.

Rotten tree trunks, Maricao (*Hess 222*) and Arecibo (*Sintenis 6353*), Porto Rico:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Martinique; St. Vincent; Grenada; Trinidad; Tobago. Mexico to southern Brazil. Reported also from Saba and Dominica, and from the Old World tropics. The St. Vincent and Grenada specimens are often much larger than above indicated and differ in other respects, possibly representing a distinct species. Much of the Continental material commonly referred to *H. ciliatum* is obviously not conspecific with the typical Greater Antilles plant; the synonymy is extensive and complicated.

7. **Hymenophyllum microcarpum** Desv. Mém. Soc. Linn. Paris 6: 333. 1827.

Rhizomes wide-creeping, 0.5–0.7 mm. thick, wiry, freely clothed with lax, griseous or pale ferruginous hairs. Fronds distant (3–12 cm.), ascending, elastic, 12–30 cm. long, the stipes about half as long as the blades, rather stout, dark brown, strongly green-alate in the upper half or two-thirds (2 mm. broad), persistently clothed with coarse, furcate or stellate, rusty hairs, the alate rachis similarly hairy beneath, glabrous above; blades deltoid-oblong or subovate, long-acuminate at apex, 8–22 cm. long, 4–14 cm. broad at or near the base, deeply 3–4-pinnatifid; pinnae alternate, close, laxly ascending (often recurved), 2–7 cm. long, obliquely deltoid-lanceolate from an unequal base (widely excavate below), long-acuminate or attenuate at apex, very obliquely 2–3-pinnatifid; ultimate segments numerous, strongly anadromous, linear, roundish at apex, about 1 mm. broad, the alate costae twice as broad; leaf-tissue dark green, glabrous on both sides, the margins subdenticulate, rigidly appressed-ciliate with mostly simple hairs; costae glabrous above, persistently clothed with simple, forked, and stellate hairs beneath; sori very numerous, mostly broader than the sterile portion of the segment, the indusia ovate-oblong, free to the broadly cuneate base, the acutish apex slightly denticulate, glabrous or bearing a few reduced deciduous moniliform hairs; receptacles deeply included.

Mossy tree trunks and logs, and occasionally on wet shaded rocks, at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola. Guatemala to Bolivia and Brazil.

Hymenophyllum hirsutum (L.) Sw. is reported by Urban on a specimen said to have been collected in eastern Porto Rico by Schwanecke. No material has been seen.

Hymenophyllum sp. An additional species, perhaps new, is represented by *Gleason & Cook P. 40*, recently collected on the upper slopes of Cerro de la Punta, but the material is too scant for description.

Order 4. SALVINIALES.

Aquatic, free-floating annual or mud-inhabiting perennial plants of varied habit and vegetative structure, the leaves or their blades mostly small, filiform to roundish, entire, 2-lobed, or 2- or 4-foliate. Sporangia aggregate, the sori borne (1 to many) within special bony or membranous, globose to oblong-ovoid, stalked or sessile sporocarps (conceptacles). Spores of 2 kinds (plants heterosporous), archegonial prothallia developing mainly from the megaspores and antheridial ones from the very numerous microspores.

Plants free-floating; leaves small, with simple, entire or 2-lobed blades; sporocarps thin-walled, containing either megaspores or microspores.

Plants rooting in mud, with slender elongate rhizomes; leaves elongate, filiform, or the blades surmounting slender petioles, 2- or 4-foliate; sporocarps with thick bony walls and containing both megaspores and microspores.

Fam. 1. SALVINIACEAE.

Fam. 2. MARSILEACEAE.

Family 1. **SALVINIACEAE.**

Small or minute, aquatic, floating plants, with somewhat elongate, simple or racemosely branched axis, furnished with roots (*Azolla*) or some of the leaves radicleform (*Salvinia*). Leaves opposite or alternate, simple, apparently in 2 ranks. Sporocarps soft and thin-walled, borne singly or 2 to several together at the base of the leaves, 1-celled, having a central, often branched receptacle, unisexual, bearing either megasporangia containing each a solitary megaspore or microsporangia containing very numerous and minute microspores. Two genera of wide distribution, *Salvinia*, with about 15 species, and the following:

1. **AZOLLA** Lam. Encycl. 1: 343. 1783.

Fugacious, minute, reddish or green, free-floating moss-like plants, the stems racemosely branched, provided with numerous solitary or fasciculate, basal roots. Leaves distichous, close or imbricate, very minute, deeply 2-lobed; lobes opposed, unequally developed, the upper ones distended and covering the upper side of the stem, the lower ones submersed and appressed to the opposite side. Sporocarps borne in 1 or 2 pairs at the base of the branches, dimorphous, the smaller ones ovoid or acorn-shaped, containing a solitary megasporangium and a few minute separate bodies at apex; the larger ones globose, with basal placenta, this bearing numerous pedicellate microsporangia containing 2-8 glochidiate microspore-masses, called massulae. (Greek, signifying killed by drought.) About 5 species, of wide distribution. Type species: *Azolla filiculoides* Lam.

1. **Azolla caroliniana** Willd. Sp. Pl. 5: 541. 1810.

Azolla microphylla Kaulf. Enum. Fil. 273. 1824.

Azolla cristata Kaulf. op. cit. 274.

Salvinia Azolla Raddi, Pl. Bras. 1: 2. pl. 1, f. 3. 1825.

Azolla densa Desv. Mém. Soc. Linn. Paris 6: 178. 1827.

Azolla portoricensis Spreng. Syst. Veg. 4: 9. 1827.

Azolla mexicana Schlecht. & Cham. Linnaea 5: 625. 1830.

Plants minutely frondose, roundish to deltoid or ovate-oblong in outline, 1-3 cm. broad and long; stem terete, with copious lax roots (1-5 cm. long), alternately branched, the branches pseudo-dichotomous; leaves crowded, usually imbricate, the upper lobes oval, 0.7-0.9 mm. long, 0.5-0.6 mm. broad, green, bronze, or deep roseous, furnished with many 2-celled hairs above, deeply cavernous beneath; lower (submersed) lobes larger, pale, delicate, glabrous. Sporocarps glabrous; megasporangia ovoid-apiculate, 0.4-0.55 mm. long; microsporangia numerous, containing each 3-6 massulae, the glochids 3-4-septate.

Pools, drainage ditches, and sluggish streams, at lower elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Trinidad; Tobago. Widely distributed in Continental America from the United States southward.

Family 2. **MARSILEACEAE.**

Perennial herbaceous plants, the rhizomes slender, creeping, casually branched, rooting in mud. Leaves distichous, alternate, more or less remote, either filiform and lacking a blade, or long-petiolate with 2-foliate or 4-foliate blades, the segments of a cuneate type, with close flabellate-dichotomous venation. Sporocarps bony, globose or oblong-ovoid, pedunculate, pilose, borne upon the rhizome near the base of the petioles or upon the petioles, solitary or aggregate, variously septate. Sori solitary within the compartments, each producing both megaspores and microspores. Three genera and about 65 species, of temperate and tropical regions.

1. **MARSILEA** L. Sp. Pl. 1099. 1753.

Plants of shallow ponds, ditches, and marshy shores. Leaves long-petiolate; blades 4-foliolate, suborbicular in expanded outline, the segments sessile, subverticillate. Sporocarps subglobose to oblong-ovoid, mostly with 2 teeth near the base, 2-celled vertically, with many transverse partitions, splitting into 2 valves at maturity and emitting a band of mucilaginous tissue, this bearing the sori at intervals within membranous envelopes. Sori including both megasporangia and microsporangia, the former usually few, with solitary megaspores, the latter many, with numerous microspores. (Name in honor of Marsigli, an early Italian naturalist.) Species about 60, chiefly Old World. Type species: *Marsilea quadrifolia* L.

Sporocarps few, oblong-ovoid, 5–6 mm. long, solitary, the peduncles borne singly from the rhizome at the base of the petioles.

Sporocarps numerous, subglobose, 2–3 mm. thick, short-pedunculate, borne in a long row upon the petioles in their lower third or half.

1. *M. Berteroi*.2. *M. polycarpa*.1. **Marsilea Berteroi** A. Br. Monatsb. Preuss. Akad. Wiss. Berlin 1870: 747. 1870.

Leaves laxly ascending, 5–12 cm. long, solitary, the petioles very delicate, glabrate; leaflets broadly obovate-cuneate or rounded-obdeltoid, 0.5–2 cm. broad at the broadly rounded apex, lightly concave at sides, entire, light green, at first thinly sericeous, early glabrate; veinlets not very close, freely joined. Sporocarps few, oblong-ovoid, 5–6 mm. long, 4 mm. broad, with a single tooth, densely and persistently appressed-rusty-hirsute, borne singly on solitary peduncles (5–12 mm. long) arising from the rhizome at the base of the petioles; sori about 23 in each sporocarp.

Shallow water and lagoon borders, at sea-level, Porto Rico:—Hispaniola. Reported from Mexico and Argentina.

2. **Marsilea polycarpa** Hook. & Grev. Icon. Fil. 2: 160. 1829.

Marsilea brasiliensis Mart. Icon. Pl. Crypt. 122. pl. 73, f. 2. 1834.

Marsilea picta Fée, Mém. Foug. 9: 47. 1857.

Zalusianskya polycarpa Kuntze, Rev. Gen. Pl. 2: 823. 1891.

Leaves ascending, mostly 5–25 cm. long, solitary, the petioles canaliculate, sparsely pilose, glabrescent; segments broadly obovate-cuneate or rounded-obdeltoid, 0.5–3.5 cm. long, 0.5–3.5 cm. broad at the broadly rounded apex, lightly concave at sides, entire, light green, at first lightly sericeous; veinlets close, frequently joined. Sporocarps numerous (6–25), inserted upon the petiole, arising separately in a row 1–5 cm. distant from its base, short-pedunculate (0.5–2 mm.), subglobose, 2–3 mm. thick, without teeth, at first densely rusty-hairy; sori 6–10 in each sporocarp.

In shallow water and partly emerged at the edge of lagoons, at sea-level, Porto Rico:—Jamaica; Cuba; Hispaniola. Mexico, southward sparingly to Brazil; also in Tahiti.

Order 5. LYCOPODIALES.

Terrestrial or epiphytic, mainly perennial plants, the stems elongate, monopodially branched or freely dichotomous, prostrate or erect to pendent, mostly very leafy. Leaves relatively minute, simple, filiform to broad, sessile to adnate-decurrent, costate, ligulate or not, rarely verticillate, mostly adjacent to imbricate and spirally inserted in 4 to many ranks. Sporangia 1–3-celled, valvate, solitary at or upon the adaxial base of the sporophylls, these similar to the vegetative leaves or modified and often aggregate in

terminal spikes (strobiles). Spores uniform (plants homosporous) or of 2 kinds and sizes, megaspores and microspores (plants heterosporous).

Spores uniform (plants homosporous).

Stems conspicuously leafy, the leaves in 4 to very numerous ranks; sporophylls not bifid; sporangia mostly compressed laterally, 1-celled, 2-valvate.

Stems (in our species) skeleton-like and nearly naked, the leaves few, squamiform, borne remotely in 2 or 3 ranks; sporophylls deeply bifid; sporangia (in our species) depressed-globose, umbilicate, 3-celled, 3-valvate.

Spores of 2 kinds and sizes, megaspores and microspores (plants heterosporous).

Fam. 1. LYCOPODIACEAE.

Fam. 2. PSILOTACEAE.

Fam. 3. SELAGINELLACEAE.

Family 1. LYCOPODIACEAE.

Terrestrial or chiefly epiphytic plants of erect, trailing, or pendent growth, the stems usually with numerous, apparently alternate branches or repeatedly dichotomous, of ericoid or mosslike habit, leafy nearly throughout. Leaves small, simple, 1-nerved, continuous with the axis, mostly uniform and multifarious, usually imbricate. Sporangia uniform, 1-celled, 2-valvate, mostly reniform to orbicular in outline and compressed, the sporophylls resembling ordinary vegetative leaves or much modified, bractlike, and often compactly imbricate. Spores uniform, minute, globose, very numerous. Prothallia fleshy, tuberous, mostly hypogean, monoecious. Two genera, *Phylloglossum* (with a single species), of Australia, and the following:

1. LYCOPODIUM L. Sp. Pl. 1100. 1753.

Perennial plants of varied habit, ranging in structure from equally and repeatedly dichotomous to falsely monopodial, the apparently main axis then assurgent or prostrate. Leaves arranged in 4-24 ranks or more, similar or dimorphous, usually close and imbricate, rigidly ascending to spreading or reflexed; mostly decurrent. Sporangia borne more or less continuously along the axes (the sporophylls not differing greatly from the vegetative leaves), or in terminal, sessile or stalked spikes (strobiles), the sporophylls compactly imbricate and often greatly modified. Spores copious, sulphur-yellow. (Greek, wolf's foot; of doubtful application.) Species about 200, mainly of temperate and mountainous tropical regions. Type species: *Lycopodium clavatum* L.

A. Sporophylls similar to the leaves, or only slightly different, not arranged in terminal strobiles.

1. Plants terrestrial.

Stems 2-3 mm. thick; leaves in 14-16 ranks, subulate, 0.6-0.8 mm. broad, denticulate-ciliolate, decurved or reflexed.

Stems 1 mm. thick; leaves in 12 ranks, filiform, 0.2-0.3 mm. broad, entire, oblique-spreading, often subsecund.

2. Plants epiphytic.

a. Leaves 0.5 mm. broad or less.

Stems 0.2-0.5 mm. thick, laxly pendent; leaves 4-6 mm. long, 0.2 mm. broad, ascending to suberect-incurved; sporangia suborbicular, 0.6-0.8 mm. broad.

Stems 1.5-2 mm. thick, arcuate-spreading; leaves 8-18 mm. long, 0.4-0.5 mm. broad, wide-spreading; sporangia reniform, 1.5 mm. broad

b. Leaves 1-3.5 mm. broad.

* Divisions funiform, 4-6 mm. broad (including leaves); leaves in 14 or 16 ranks, uniform, rigidly ascending and incurved.

** Divisions not funiform, 1-5 cm. broad (including leaves); leaves in 4-10 ranks, partly gibbous at base, mostly horizontal or oblique-spreading, not incurved.

† Stems less than 1.5 mm. thick, laxly pendent or flaccid; sporangia 1-1.6 mm. broad.

Leaves irregularly 4-6-ranked, remote, elliptic-oblongate, 6-9 mm. long, 1-1.5 mm. broad above the middle.

1. *L. reflexum*.

2. *L. portoricense*.

3. *L. setaceum*.

4. *L. Wilsoni*.

5. *L. funiforme*.

6. *L. tenuicaule*

Leaves spirally arranged in 6 ranks, linear-lanceolate, 1.2-2.5 cm. long, 1.5-3.5 mm. broad below the middle.

- †† Stems 1.5-4 mm. thick, stiffly decurved-spreading to subpendent; sporangia 2 mm. broad. Leaves linear-subulate, less than 1.5 mm. broad.

Leaves lance-linear, 2-3 mm. broad.

- B. Sporophylls conspicuously different from the leaves, arranged in compact terminal strobiles.

Plants epiphytic, laxly pendent; leaves in 4 ranks; strobiles quadrangular, lax, 2-6 times dichotomous.

Plants terrestrial, the apparently main stems prostrate to erect; leaves in 6-24 ranks; strobiles cylindric, rigid, simple.

Main stems creeping, prostrate, the leaves strongly dimorphous, dorsiventrally arranged in 6 ranks; strobiles few, borne on long, rigidly erect, simple peduncles.

Main stems horizontal-arching to assurgent or erect, elongate, with numerous, much divided, apparently alternate, leafy branches, the ultimate ones terminating in solitary, sessile, pendent strobiles; leaves in 10-24 ranks.

Leaves in 10-14 ranks, thick, lustrous, rigidly spreading and broadly incurved, hyaline-ciliate, 0.4-0.6 mm. broad.

Leaves in 16-24 ranks, herbaceous, oblique-spreading and upcurved, entire or obscurely denticulate-ciliolate, 0.2-0.4 mm. broad.

7. *L. linifolium*.

8. *L. dichotomum*.

9. *L. taxifolium*.

10. *L. aqualupianum*

11. *L. meridionale*.

12. *L. curvatum*.

13. *L. cernuum*.

1. ***Lycopodium reflexum*** Lam. Encycl. 3: 653. 1789.

Urostachys reflexus Herter, Beih. Bot. Centralbl. 39: 249. 1922.

Plants terrestrial, the smaller ones 10-20 cm. long, rigidly erect, simple or 1-2-dichotomous, the larger ones (20-70 cm.) mostly erect from a decumbent or decurved base, several times dichotomous, the divisions rigidly erect, coarctate, of equal thickness throughout, sporangiate nearly to the base. Stems rigid in drying, 2-3 mm. thick (leaves excluded), ridged, 8-15 mm. broad including the leaves, yellowish green; leaves crowded, spirally arranged in 14-16 close ranks, subulate, 6-10 mm. long, 0.6-0.8 mm. broad at base, thence evenly attenuate to the pungent cartilaginous apex, rigidly hyaline-ciliolate or denticulate-ciliolate throughout, plane and lustrous on both faces, decurved or at length all sharply reflexed from the base, rigidly herbaceous, the costa evident only at the extreme abaxial base, short-decurrent. Sporophylls like the leaves; sporangia 1-1.2 mm. broad, oblong-reniform, the sinus small and shallow.

Steep banks, sunny thickets, and cliffs, at lower to higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe. Mexico to Paraguay and Bolivia. Reported from Dominica, Martinique, St. Vincent, and Trinidad.

2. ***Lycopodium portoricense*** Underw. & Lloyd, Bull. Torrey Club 33: 108. 1906.

Urostachys portoricensis Herter, Repert. Nov. Sp. Fedde 19: 163. 1923.

Plants terrestrial, 10-30 cm. long, laxly ascending or recurved-arcuate from an erect base, 3-7 times dichotomous, the divisions of equal thickness, loosely fasciculate, of bushy habit, the apical and subapical ones interruptedly sporangiate. Stems 1 mm. thick (leaves excluded), mostly 8-12 mm. broad including leaves; leaves spirally arranged in 12 ranks, close, oblique-spreading (or the upper ones ascending), uniform, filiform, 6-10 mm. long, 0.2-0.3 mm. broad, pungent, falcate, subsecund, firmly herbaceous, concave adaxially, convex abaxially, often costate on one or both faces, narrowly long-decurrent, sharply carinate only at base. Sporophylls similar to the leaves but slightly broadened at base; sporangia suborbicular, 0.8-1 mm. broad, the sinus shallow.

On rocks and clay banks along water courses, at middle elevations, eastern Porto Rico. Endemic. Very closely related to *L. setaceum* Lam.

3. **Lycopodium setaceum** Lam. Encycl. 3: 653. 1789.

Lycopodium acerosum Sw. Fl. Ind. Occ. 3: 1575. 1806, in part.

Plants epiphytic, laxly pendent, 30–80 cm. long, many times acutely dichotomous, the divisions slender, usually flaccid and closely associated, those of the upper part densely and subcontinuously sporangiate. Stems 0.2–0.5 mm. thick (leaves excluded), 3–8 mm. broad including leaves; leaves spirally arranged in 10 ranks, often appearing subverticillate in 5's, imbricate, ascending to suberect and incurved, almost capillary, 4–6 mm. long, about 0.2 mm. broad at base, long-attenuate, pungent, falcate, delicately herbaceous, entire, deeply concave adaxially, convex and wrinkled lengthwise on the abaxial face, obscurely costate, carinate only toward the base, the costa and parenchyma narrowly long-decurrent. Sporophylls variable, mostly 3–4 mm. long, subulate from a lanceolate base, or in densely fertile apical branches shorter (2 mm.), lance-ovate, long-acuminate, subcarinate, excavate at base and partially concealing the sporangia; sporangia suborbicular, 0.6–0.8 mm. broad, slightly shorter, the sinus shallow.

Pendent from the trunks of forest trees, at middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; Guadeloupe; Dominica; Martinique; Grenada; Trinidad. Mexico to Brazil.

Listed by Urban as *L. verticillatum* L. f., under which name it is reported from several parts of the Old World tropics.

4. **Lycopodium Wilsoni** Underw. & Lloyd, Bull. Torrey Club 33: 111. 1906.

Lycopodium trichodendron Herter, Bot. Jahrb. Engler 43: Beibl. 98: 49. 1909.

Urostachys Wilsoni Herter, Repert. Nov. Sp. Fedde 19: 163. 1923.

Urostachys trichodendron Herter, loc. cit.

Plants epiphytic, 10–25 cm. long, arcuate-spreading or recurved from an erect base, 1–5 times dichotomous, the divisions subdivergent, of equal thickness, all but the lower ones subcontinuously sporangiate. Stems 1.5–2 mm. thick (leaves excluded), 1.5–2.5 cm. broad including leaves; leaves spirally arranged in 10 ranks, wide-spreading, narrowly linear-attenuate, nearly filiform, 8–18 mm. long, 0.4–0.5 mm. broad toward the base, subfalcate, thin-herbaceous, entire, deeply concave adaxially, convex and wrinkled lengthwise on the abaxial face, the costa prominent in the lower half, strongly carinate at the decurrent base in drying. Sporophylls like the leaves; sporangia reniform, 1.5 mm. broad, 1.3 mm. long, the sinus rather shallow.

Trunks of forest trees, Luquillo Mountains, Porto Rico:—Guadeloupe. Colombia.

5. **Lycopodium funiforme** Bory in Brongn. Hist. Vég. Foss. 2: 10, 18. pl. 7, f. 9. 1837; Spring, Mém. Acad. Sci. Belg. 15⁶: 50. 1842.

Urostachys funiformis Herter, Repert. Nov. Sp. Fedde 19: 163. 1923.

Plants pendent, 0.5–2 m. long, 1–4 times dichotomous, the divisions funiform, of equal thickness, the apical ones freely sporangiate. Stems 1.5–2 mm. thick (4–6 mm., including leaves), concealed at maturity; leaves crowded, spirally arranged in 14 or 16 ranks, often appearing subverticillate in 7's or 8's, uniform, rigidly ascending, incurved, subulate-attenuate, 8–11 mm. long, 1–1.5 mm. broad at base, thick, rigid, lustrous, pungent, entire, deeply concave adaxially (or the margins involute), strongly convex abaxially, appearing subterete, sharply carinate toward the base, the keel decurrent. Sporophylls similar to the leaves, or more narrowly involute, not reduced; sporangia about 1.5 mm. broad, cordate-orbicular or subhippocrepiform, the valves often distorted.

Pendent from stumps and trunks of forest trees, at middle elevations, Porto Rico:—Cuba; Hispaniola; Guadeloupe. British Guiana. Reported credibly also from Martinique and St. Vincent.

6. **Lycopodium tenuicaule** Underw. & Lloyd, Bull. Torrey Club 33: 113. 1906.

Urostachys tenuicaulis Herter, Repert. Nov. Sp. Fedde 19: 165. 1923.

Plants epiphytic, 10–30 cm. long, laxly pendent, 2–4 times dichotomous, the divisions equal, arising at an acute angle, all but the lower ones continuously sporangiate. Stems 0.3–0.7 mm. thick (leaves excluded), 1–1.8 cm. broad including leaves; leaves horizontal or oblique-spreading, remote, irregularly 4–6-ranked, often appearing alternate or subopposite, mostly gibbous at base and somewhat dorsiventral in arrangement, narrowly elliptic-oblongate, 6–9 mm. long, 1–1.5 mm. broad above the middle, acute or acutish at apex (the tip pungent), entire, lightly hyaline-marginate, subfalcate, slightly asymmetric, yellowish green, firmly herbaceous, plane on both faces, often wrinkled in drying, the costa prominent on the abaxial face, sharply carinate at base, conspicuously long-decurrent, the parenchyma broadly so. Sporophylls like the leaves, distant, oblique-spreading; sporangia reniform, 1–1.3 mm. broad, about 0.8 mm. long, the sinus very deep.

Pendent from the trunks of forest trees, slopes of El Yunque, Luquillo Mountains, Porto Rico (Wilson 139; Gleason & Cook M. 187).—Dominica; Guadeloupe.

7. **Lycopodium linifolium** L. Sp. Pl. 1100. 1753.

Urostachys linifolius Herter, Repert. Nov. Sp. Fedde 19: 165. 1923.

Plants epiphytic, pendent, flaccid, 40–60 cm. long, 2–6 times dichotomous, the divisions of equal breadth or in fully mature plants the densely sporangiate apical divisions narrow and closely fasciculate. Stems 0.7–1.4 mm. thick (leaves excluded), 2.5–5 cm. broad including leaves, or often narrower upward; leaves horizontal or oblique-spreading, subdistant in drying, borne spirally in 6 ranks, mostly gibbous at the constricted base (thus somewhat dorsiventral in position), narrowly linear-lanceolate to lance-attenuate, 1.2–2.5 cm. long, 1.5–3.5 mm. broad in the lower third, evenly narrowed to the pungent tip, straight or subfalcate, usually light or yellowish green, thin-herbaceous, plane or convex and wrinkled on the adaxial face, plane or slightly concave abaxially, the margins entire, lightly hyaline; costa prominent abaxially, carinate at base, together with the parenchyma conspicuously decurrent. Sporophylls similar to the leaves, or often much shorter and ascending; sporangia orbicular-reniform, 1.2–1.6 mm. broad, the sinus shallow.

Hanging from stumps, trunks, and branches of trees in deep forest, at lower and middle elevations, Porto Rico; abundant.—Jamaica (rare); Cuba; Hispaniola; Guadeloupe; Martinique; Grenada; Trinidad; Tobago. Mexico to Brazil and Bolivia. Reported credibly from Dominica and St. Vincent.

8. **Lycopodium dichotomum** Jacq. Enum. Stirp. Vind. 314. 1762; Hort. Bot. Vind. 3: 26. pl. 45. 1776.

Lycopodium barbatum Christ, Bull. Herb. Boiss. II. 5: 254. 1905.

Lycopodium mexicanum Herter, Bot. Jahrb. Engler 43: Beibl. 98: 49. 1909.

Lycopodium chamaepeuce Herter, op. cit. 50.

Urostachys dichotomus Herter, Beih. Bot. Centralbl. 39: 249. 1922.

Urostachys mexicanus Herter, Repert. Nov. Sp. Fedde 19: 164. 1923.

Urostachys chamaepeuce Herter, loc. cit.

Plants epiphytic, mostly 30–60 cm. long, subpendent from an ascending arcuate base, 2–5 times dichotomous, the divisions oblique-divaricate and of equal thickness, or the densely sporangiate apical and subapical ones gradually narrower and diverging at a smaller angle. Stems 2–4 mm. thick (leaves excluded), 1–4 cm. broad including the leaves; leaves crowded, spirally arranged in 8 or 10 ranks, mostly spreading, linear-subulate, mostly 1–2 cm. long, 1–1.4 mm. broad in the lower part, subfalcate, rigid, herbaceous, entire, subconvex adaxially, lightly concave abaxially (the margins closely subrevolute), the costa evident, carinate at the straight or gibbous base, both costa and parenchyma decurrent. Sporophylls similar to the leaves, or often shorter and more oblique in mature specimens, sometimes involute, not expanded at base, much narrower than the sporangia; sporangia 2 mm. broad, reniform, with deep sinus.

Trunks of forest trees, at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Dominica; Martinique; St. Vincent; Grenada; Trinidad. Mexico to Brazil.

9. *Lycopodium taxifolium* Sw. Prodr. 138. 1788; Fl. Ind. Occ. 3: 1573. 1806.

Lycopodium Schwendenerii Herter, Bot. Jahrb. Engler. 43: Beibl. 98: 50. 1909.

?*Lycopodium cubanum* Herter, loc. cit.

Urostachys taxifolius Herter, Repert. Nov. Sp. Fedde 19: 162. 1923.

Urostachys Schwendenerii Herter, op. cit. 165.

Plants epiphytic, 25–70 cm. long, mostly 3–6 times dichotomous, variable, stiffly arcuate-decurved (the divisions rigid, diverging at 40–60°, scarcely decrescent toward the apex) to decurved and subpendent, the apical divisions then subparallel, densely sporangiate, and strongly decrescent. Stems firm, 1.5–4 mm. thick (leaves excluded), in the lower part 2–4 cm. broad including the spreading leaves, often narrower upward, the leaves becoming oblique; leaves usually close, spirally arranged in 6–8 ranks, lance-linear, broadly attenuate to the cartilaginous tip, 1.3–2 cm. long, 2–3 mm. broad above the base, entire (the margins hyaline-thickened), straight or slightly curved, firm-herbaceous, plane on both faces or lightly concave abaxially, the costa concealed, carinate at base and decurrent as a strong ridge. Sporophylls in 6–8 ranks, similar to the leaves in form and size, or, especially in pendent forms, reduced (6–10 mm.), oblique, subulate-involute from a broadly ovate, concave base; sporangia reniform, about 2 mm. broad, the sinus deep.

Stumps and mossy trunks of forest trees, at middle and higher elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad. Mexico to northern South America. Reported from St. Lucia.

The Porto Rican specimens belong mostly to the comparatively lax form, with leaves in 6 ranks, which was listed by Urban as *L. passerinoides* H. B. K. and described more recently as *L. Schwendenerii*.

10. *Lycopodium aqualupianum* Spring, Mém. Acad. Sci. Belg. 15⁶: 68. 1842.

Lycopodium guadalupianum Fée, Mém. Foug. 11: 131. pl. 33, f. 1. 1866.

Urostachys aqualupianus Herter, Repert. Nov. Sp. Fedde 19: 166. 1923.

Plants epiphytic, pendent, flaccid, 30–60 cm. long; frond consisting of 2 distinct parts, the basal portion sterile, 20–30 cm. long, simple to twice dichotomous, foliaceous, truncate, the terminal portion strobilary, abruptly contracted, 5–35 cm. long, 2–6 times dichotomous, the divisions quadrangular, slender (1.5–2 mm. thick), laxly subdivaricate. Stems 1–1.5 mm. thick (leaves excluded), partly visible, 10–18 mm. broad including leaves; leaves spirally arranged in 4 ranks, oblique-spreading, broadly elliptic, 6–11 mm. long, 3–4.5 mm. broad, acutish at apex, obliquely attached at the acute base, plane, entire (the margins lightly cartilaginous to the subcuspidate apex), herbaceous, sublustrous, costate abaxially, carinate at base, both costa and parenchyma decurrent. Sporophylls closely imbricate, mostly 2–3 mm. long, ovate, long-acuminate, sharply carinate to the incurved apex, deeply concave, concealing the sporangia; sporangia orbicular-reniform or subhippocrepiform, about 1.5 mm. broad, the sinus very deep.

Trunks of forest trees, at middle and higher elevations, Porto Rico:—Cuba; Hispaniola; Guadeloupe; Dominica; Trinidad. Reported also from Martinique and St. Vincent, and from northeastern South America.

11. *Lycopodium meridionale* Underw. & Lloyd, Bull. Torrey Club 33: 121. 1906.

Plants terrestrial, the main stem prostrate, creeping, with short, alternate, distant, simple or pinnately branched lateral branches of similar form, these and the main axis bearing a few long, finely bracteate, rigidly erect peduncles

with solitary cylindric strobiles. Stems 15–30 cm. long, 1–2 mm. thick (leaves excluded), 7–12 mm. broad including leaves, naked beneath; leaves strongly dimorphic, dorsiventral in arrangement, borne in 6 ranks (2 lateral, 4 upper), the lateral leaves oblique-spreading, ovate, acuminate, 5–8 mm. long, 2–2.5 mm. broad, decurved-falcate, asymmetrical, firmly herbaceous, broadly decurrent, plane or irregularly wrinkled on the adaxial face (the margin revolute or not), carinate-decurrent; upper leaves oblique, subimbricate, lance-subulate, 5–7 mm. long, 1–1.4 mm. broad, straight or upwardly subfalcate, irregularly wrinkled, the margins entire, often revolute. Upright strobilary branches 10–25 cm. long, the peduncle terete, 1–1.5 mm. thick, the leaves acicular, rigidly ascending, in about 10 ranks, subverticillate in alternating groups of 5; strobiles 2.5–8 cm. long, the sporophylls narrowly triangular-ovate, 4–6 mm. long, 1–1.5 mm. broad, acutely decurrent, subulate-attenuate in the upper half (the tips spreading with age), the margins lightly erose-denticulate below; sporangia cordate-reniform, 1–1.3 mm. broad, depressed, the adaxial valve saccate.

Open marshy situations, at lower and middle elevations, Porto Rico:—Cuba; Hispaniola; Guadeloupe; Dominica; Trinidad. British Guiana to Bolivia and southern Brazil. Listed originally by Urban as *L. carolinianum* L.

12. ***Lycopodium curvatum*** Sw. Journ. Bot. Schrad. 1800²: 116. 1801; Syn. Fil. 178, 402. 1806.

?*Lepidotis convoluta* Beauv. Prodr. Aetheog. 108. 1805.

Plants terrestrial, the main stem horizontal, thinly clothed with appressed subulate leaves, arching and striking root at distant intervals, giving rise to aerial shoots, these rigidly erect, 80 cm. high or more, with numerous close, apparently alternate, branched, densely leafy divisions, the ultimate ones terminating in sessile cylindrical strobiles. Upright stems woody, terete, 3–4 mm. thick (leaves excluded), densely leafy in the branched upper part; leaves closely spiral in 10–14 ranks, subulate-attenuate, about 4 mm. long, 0.4–0.6 mm. broad at base, rigidly spreading and broadly incurved, thick, lustrous, hyaline-ciliate nearly to the acicular tip, deeply concave adaxially, strongly convex on the abaxial face, the costa elevated downward, sharply carinate at the densely hirtellous base and long-decurrent; lateral branches pyramidal in arrangement, spreading, short (4–8 cm.), pinnately branched, the divisions once or twice dichotomous, all the parts cylindrical, densely leafy, the leaves inflated at base, mostly smaller than those of the main upright stem. Strobiles numerous, pendent, 1–2 cm. long, 4 mm. thick; sporophylls densely imbricate in about 10 ranks, ovate to deltoid-ovate, rigidly long-acuminate, 1.5–2 mm. long, obliquely fimbriate-ciliate; sporangia immersed, 0.6–0.8 mm. thick, irregularly subglobose, the valves strongly unequal.

Sierra Luquillo, Porto Rico, at middle elevations (*Sintenis 1547*; *Wilson 101*):—Jamaica, in sphagnum depressions.

The Lesser Antilles plants sometimes referred to this species belong mostly, if not wholly, to *L. tortum* Sieber.

13. ***Lycopodium cernuum*** L. Sp. Pl. 1103. 1753.

Lycopodium capillaceum Willd.; Spring, Flora 21¹: 165. 1838.

Plants terrestrial, the main stem horizontal-arching, with several ascending aerial branches, or more commonly itself ascending, the lowermost branch widely decurved-spreading and radicate, the main portion assurgent, 30–65 cm. long, with many close, apparently alternate, densely leafy, spreading, freely branched lateral divisions, the ultimate ones ending in sessile cylindric strobiles. Stem woody, terete, mostly 2–3 mm. thick (leaves excluded), densely leafy upward; leaves spirally arranged in 16–24 ranks, often appearing subverticillate in half as many, subulate-attenuate, about 4 mm. long, 0.2–0.4 mm. broad at base, acicular at tip, entire or obscurely denticulate-ciliate, mostly spreading, herbaceous, irregularly concave adaxially, strongly convex on the abaxial face, often obliquely inserted, carinate and unevenly decurrent at base, here usually

hirtellous; lateral branches up to 15 cm. long, pinnately branched, the divisions subpinnately branched or mostly once or twice dichotomous, all the parts densely leafy, the leaves similar to those of the stems but slightly smaller, oblique-spreading and upcurved. Strobiles many, subpendent, 0.5–3 cm. long, 2–3 mm. thick; sporophylls appressed-imbricate, in about 10 ranks, triangular-acuminate, about 2 mm. long, constricted at base, obliquely fimbriate-ciliate; sporangia immersed, 0.5–0.7 mm. thick, subglobose, the valves strongly unequal.

Moist or dryish, sunny thickets, roadside banks, and forest borders, at lower and middle elevations, Porto Rico; St. Thomas:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Trinidad; Tobago. Florida to southern Mississippi; tropical continental America generally; also widely distributed, in one form or another, in the Old World tropics.

A highly variable, collective species, as usually understood. The description applies primarily to the common tropical American plant, not including several apparently valid, segregate forms proposed in recent years. A number of Old World segregates have been described, also.

Urostachys Sintenisii Herter (Repert. Nov. Sp. Fedde **19**: 161. 1923), described solely from a Berlin specimen of *Sintenis* 5429, which was listed originally by Urban as *Lycopodium taxifolium* Sw., has not been seen. From description it appears to be an ally of *L. reflexum* Lam.

Family 2. PSILOTACEAE.

Plants mainly epiphytic or subepiphytic, the stems either simple and provided with small, approximate, 2-ranked leaves (*Tmesipteris*); or skeleton-like and many times acutely dichotomous, with complanate or narrowly triquetrous ultimate divisions, the leaves remote, minute, squamiform, simple. Sporangia cymbiform and transversely bilocular (*Tmesipteris*); or depressed-globose and 3-celled, dehiscing vertically, attached at the adaxial base of reduced, distant, bifid fertile leaves (sporophylls). Spores very numerous, uniform, reniform. Genera 2, *Tmesipteris*, of Oceanica and Australasia, with a single variable species, and the following:

1. **PSILOTUM** Sw. Journ. Bot. Schrad. **1800**²: 109. 1801.

Plants epiphytic or terrestrial, or perhaps saprophytic, with short-creeping rhizomes, the main stems subfasciculate, slender, elongate, simple in the lower part, repeatedly dichotomous above, the numerous divisions narrow, elongate, complanate and crenate or narrowly 3-alate. Leaves few and minute, alternate and distichous or spirally 3-ranked, subulate-squamiform, distant, the sterile (lower) ones simple and entire. Sporangia uniform, depressed-globose, sessile, coriaceous, umbilicate at apex, obtusely 3-lobed, 3-celled, dehiscing by 3 vertical valves, distant, borne on all but the main branches. Spores hyaline. (Greek, alluding to the conspicuous naked sporangia.) Species 2 or 3, widely distributed in tropical and subtropical regions. Type species: *Psilotum triquetrum* Sw.

1. **Psilotum nudum** (L.) Griseb. Abh. Ges. Wiss. Göttingen **7**: 278. 1857.

Lycopodium nudum L. Sp. Pl. 1100. 1753.

Psilotum triquetrum Sw. Journ. Bot. Schrad. **1800**²: 109. 1801.

Bernhardia dichotoma Willd. Journ. Bot. Schrad. **1800**²: 132. 1801

Psilotum floridanum Michx. Fl. Bor. Amer. **2**: 281. 1803.

Plants erect or arcuate-spreading, mostly 20–60 cm. long; main stem simple, 2–4 mm. thick, ridged above the flexuous base, the leaves remote, oblique-spreading, triangular-subulate, 2–3 mm. long; branches acutely dichotomous, the divisions very numerous, brush-like, arranged more or less in 2 planes, triquetrous, the ultimate ones decrescent, 0.5–1 mm. thick; fertile leaves rudimentary, 1 mm. long or less. Sporangia about 2 mm. broad, light brownish, lustrous.

On tree trunks or at the base of trees, at lower and middle elevations, Porto Rico; St. Thomas; St. Jan; Tortola; Virgin Gorda:—Jamaica; Cuba; Bahamas; Bermuda; Hispaniola; Saba; St. Kitts; Guadeloupe; Dominica; Montserrat; Martinique; St. Vincent; Grenada; Tobago. South Carolina and Florida; Mexico to Paraguay. Widely distributed in the Old World Tropics.

Family 3. SELAGINELLACEAE.

Terrestrial, mainly perennial, minutely leafy plants of spreading habit, the stems slender, prostrate to assurgent or suberect, producing wiry elongate rhizophores at some or all of the nodes, freely branched, the main branches apparently alternate, the ultimate ones alternate or subdichotomous. Leaves very numerous, minute, approximate to widely imbricate, 1-nerved, obscurely ligulate, either (1) all nearly alike, subulate to lanceolate, and arranged radially in many ranks, or (2) of 2 kinds, dorsiventrally arranged in 2 planes of 2 rows each, those of the lower plane (lateral leaves) usually spreading, those of the upper plane (median leaves) smaller, mostly appressed, inserted nearly at a right angle to the lateral leaves, usually imbricate. Sporophylls modified, tetrastichous, uniform or dimorphic, borne in compact sessile spikes terminating the ultimate divisions. Sporangia axillary, 1-celled, 2-valvate, producing either 1–4 large triplanate megaspores or very numerous, minute, reddish or orange, powdery microspores. A single genus.

1. *SELAGINELLA* Beauv. Prodr. Aetheog. 101. 1805.

Characters of the family. (Diminutive of *Selago*, a classical name for some species of *Lycopodium*.) Species about 600, chiefly of tropical and subtropical regions. Type species: *Lycopodium selaginoides* L.

- A. Main stem trailing or prostrate, producing rhizophores nearly or quite throughout.
 1. Plants delicate and mosslike; stem 3–15 cm. long, filiform, 2–3.5 mm. broad (leaves included); rhizophores capillary; lateral leaves of stem and main branches 1.3–2 mm. long, membranous.

Lateral leaves of stem and main branches broadly ovate-oblong, acutish, costate beneath, strongly whitish-marginate.

Lateral leaves of stem and main branches very broadly ovate, abruptly acute, subcostate, faintly marginate.
 2. Plants coarse; stem 20–75 cm. long, 1–1.7 mm. thick, 5–8 mm. broad (leaves included); rhizophores long and stout; lateral leaves of stem and main branches 2.5–4 mm. long, herbaceous.

Stem 40–75 cm. long; lateral leaves of stem and main branches 3–4 mm. long, abruptly acute and cuspidate, narrowly cordate-auriculate, rigidly thick-herbaceous.

Stem 20–40 cm. long; lateral leaves of stem and main branches 2.5–3 mm. long, broadly acutish at apex, broadly rounded at upper base, thin-herbaceous.
 - B. Main stem ascending or, if decumbent, at least the branches assurgent; rhizophores produced at base or lower nodes, or (no. 9) also at apex.
 1. Stems decumbent, or assurgent from an arcuate base; rhizophores produced at several lower nodes.

Stems 1–2 mm. thick, 6–9 mm. broad (leaves included), arcuate at base, the rhizophores stout and prop-like; branches 5–10 cm. long; larger lateral leaves 3–4.5 mm. long, dark green.

Stems 0.2–0.5 mm. thick, 4–6 mm. broad (leaves included), laxly decumbent, the rhizophores capillary and weak; branches 2–5 cm. long; larger lateral leaves 2–3 mm. long, light green.
 2. Stems ascending or suberect, producing rhizophores only at extreme base, or (no. 9) at base and decurved apex.
 - a. Lateral leaves of upper stem and main branches spreading, approximate, dark green, strongly sclerotic-striate beneath, not marginate.
1. *S. plagiochila*.
 2. *S. ovifolia*.
 3. *S. stolonifera*.
 4. *S. Krugii*.
 5. *S. portoricensis*.
 6. *S. albonitens*.
 7. *S. Sintenisii*.

- b. Lateral leaves of stem and main branches oblique-spreading, subdistant, light green, faintly or not at all sclerotic-striate, marginate throughout.

Fronds oblong to narrowly obovate, the stem 0.5–1 mm. thick, rhizophorous at extreme base, rigidly ascending; larger lateral leaves 1.7–2.5 mm. long, ovate-oblong, pulvinate in attachment, ciliate-denticulate.

8. *S. laxifolia*.

Fronds narrowly elongate-triangular, the stem 0.2–0.5 mm. thick, rhizophorous at base and frequently at the laxly recurved apex; larger lateral leaves 2.5–4 mm. long, broadly cordate-oblong, not pulvinate, long-ciliate.

9. *S. cordifolia*.

1. *Selaginella plagiochila* Baker, Journ. Bot. Brit. & For. 21: 212. 1883.

Stems 3–7 cm. long, prostrate, filiform, subterete, producing short rhizophores at all the nodes, subflexuous, laxly imbricate, forming a thin soft mat; branches few, subdistant, laxly ascending, subequal, short (4–12 mm. long), simple or the lower ones with 2 or 3 short alternate divisions; plane of main stem and branches 2.5–3.5 mm. broad (leaves included). Lateral leaves of stem and main branches spreading, apart or contiguous, 1.3–1.8 mm. long, 1–1.2 mm. broad, broadly ovate-oblong, abruptly acutish and mucronulate at apex, unequally rounded at base (the broad upper side partially incumbent), costate beneath, the margins strongly sclerotic, ciliate (cilia spreading, subdistant, those of the basal portion and upper margin 0.1–0.2 mm. long); lateral leaves of branchlets narrower, mostly oblong, subequilateral, 1.5 mm. long or less; leaf-tissue membranous, very pellucid, the blades plane, lustrous and distantly sclerotic-striate beneath. Median leaves distant, straight, 1–1.5 mm. long, elliptic-ovate, acuminate and abruptly aristate, subcarinate; margins strongly sclerotic, sparsely and subequally ciliate. Spikes solitary, terminal, 2–4 mm. long; sporophylls deltoid-ovate, acuminate, sharply carinate, 1.5 mm. long or less, ciliate.

Moist base of shaded boulders along water-courses, at lower elevations, eastern Porto Rico (*Sinten* 5385; *Goll* 490; *Shafer* 3151). Endemic.

2. *Selaginella ovifolia* Baker, Journ. Bot. Brit. & For. 22: 90. 1884.

Stems prostrate, 5–15 cm. long, filiform, sharply 4-sulcate, subflexuous, producing short, freely rooting rhizophores at all the nodes; branches few, distant (1–2 cm. apart), alternate, divaricate, rhizophorous and rooting, linear, the distal ones simple, 5–12 mm. long, the lower ones 2–4 cm. long, flexuous, with 3–6 short simple distant alternate divisions (2–3 mm. long); plane of stem and branches 2–3.5 mm. broad (leaves included). Lateral leaves of stem and larger branches spreading, half their width apart or more, 1.5–2 mm. long, 1–1.5 mm. broad, very broadly ovate, abruptly acute and mucronulate at apex, rounded-subcordate at base, exauriculate, subcostate, the margins slightly sclerotic, ciliate throughout, the cilia at upper base 0.1–0.2 mm. long, the others shorter; lateral leaves of branchlets smaller (1–1.5 mm. long), ovate-oblong to elliptic-oblong, more evenly ciliate; leaf-tissue bright green above, pale and lustrous beneath, pellucid, membranous-herbaceous, the blades often transversely involute in drying. Median leaves subdistant, narrowly ovate-acuminate, 0.6–1.2 mm. long, falcate, the margins sclerotic, distantly ciliate, the cuspidate tips upcurved. Spikes solitary or in pairs, terminal, 2–3 mm. long, thick; sporophylls lax, deltoid-ovate, acuminate, cymbiform-carinate, unequal, 0.7–1.3 mm. long, obliquely ciliate.

Clinging closely to rocks along mountain water-courses and at the base of shady cliffs, at middle and higher elevations, Porto Rico:—Cuba; Hispaniola; Guadeloupe, Martinique.

3. *Selaginella stolonifera* (Sw.) Spring, Flora 21: 193. 1838.

Lycopodium stoloniferum Sw. Prodr. 138. 1788.

Lycopodium domingense Poir. in Lam. Encycl. Suppl. 3: 559. 1813.

Main stems trailing, up to 75 cm. long, 1–1.7 mm. thick, quadrangular, stramineous, bearing stout rhizophores (6–15 mm. long) throughout, subflexuous,

alternately branched; branches spreading, frondose, not rhizophorous, oblong to obovate, mostly 10–20 cm. long, coarsely 2-pinnate, the ultimate divisions few, alternate, distant, 1–4 cm. long; plane of the main and secondary stems 6–8 mm. broad (leaves included), of the ultimate divisions 3–5 mm. Lateral leaves of stem and main branches distant, 3–4 mm. long, 1.7–2.2 mm. broad, deltoid-ovate to ovate-oblong, abruptly acute and short-cuspidate, narrowly cordate-auriculate at base, here coarsely ciliate (cilia about 0.12 mm. long), the margins obliquely denticulate beyond, revolute; lateral leaves of ultimate branches adjacent, mostly oblong, subequilateral, 1.5–2.5 mm. long; leaf-tissue light or yellowish green, thick, rigidly herbaceous, the blades subcarinate above. Median leaves narrowly oblong-ovate, rigidly long-acuminate, mostly 1–2 mm. long, peltate, subcarinate, the margins sclerotic, rigidly ciliate, the cilia oblique, 0.07–0.12 mm. long. Spikes few, solitary at the end of the ultimate divisions, 3–12 mm. long; sporophylls ovate, long-acuminate, 1.5–2 mm. long (basal ones excepted), sharply carinate-cymbiform, the margins sclerotic, ciliate-denticulate.

Rocky banks in partial shade, Rio Piedras (*Stevenson 5651*); known otherwise from Porto Rico only upon cultivated material (*Sintenish 5441*) so reported by Urban:—Jamaica; Cuba; Hispaniola.

4. *Selaginella Krugii* Hieron. in Urban, Symb. Ant. 3: 526. 1903.

Main stems 20–40 cm. long, depressed or trailing, bearing rhizophores (4–10 cm. long) nearly to the apex, about 1 mm. thick, subflexuous, with numerous oblique-spreading alternate branches, these 3–15 cm. long, irregularly produced, simply pinnate, or the larger ones rhizophorous and laxly 2-pinnate; plane of the main stem 5–6 mm. broad (lateral leaves included), of the ultimate branches 3–4 mm. Lateral leaves of the stem and main branches approximate, mostly 2.5–3 mm. long, 1.5–2 mm. broad, inequilateral, obliquely ovate-oblong, broadly acutish at apex, broadly rounded-subcordate at upper base, the margin here slightly sclerotic, rigidly and obliquely ciliate to the middle of the blade (cilia about 0.08 mm. long), very minutely denticulate beyond; lateral leaves of the ultimate branches slightly smaller, narrower, and less inequilateral; leaf-tissue firmly thin-herbaceous, bright green or yellowish-green above, lightly striate in drying. Median leaves rigid, 2–3 mm. long, exauriculate, carinate, ovate, abruptly subulate, the cusp nearly or quite as long as the blade; margins narrowly sclerotic, freely ciliate (cilia 0.1 mm. long). Spikes numerous, borne singly or in pairs on the ultimate branches, 2–6 mm. long; sporophylls carinate-cymbiform, ovate, long-acuminate, rigidly ciliate-denticulate, unequal, mostly 1.5–2 mm. long.

Wet mountain forests at middle and higher elevations, eastern Porto Rico; common. Endemic.

5. *Selaginella portoricensis* A. Br. Ann. Sci. Nat. V. Bot. 3: 288. 1865.

Main stems 15–30 cm. long, assurgent or suberect from an arcuate semi-prostrate base (here bearing stout rhizophores, 4–10 cm. long), 1–2 mm. thick, stramineous, nearly straight, with subdistant decrescent lateral branches, these alternate, laxly oblique-spreading, not rhizophorous, the larger (middle) ones 5–10 cm. long, alternately pinnate, the divisions few, distant, simple or forked; plane of the main stem 6–9 mm. broad (leaves included), of the ultimate branches 4–5 mm. Lateral leaves of the stem and main branches their width apart or more, 3–4.5 mm. long, 1.5–2.5 mm. broad, inequilateral, obliquely ovate-oblong, acute at apex, broadly rounded at upper base, here obliquely and rigidly ciliate to middle of upper margin (cilia about 0.1 mm. long), minutely denticulate beyond, the margins narrowly sclerotic, subrevolute; lateral leaves of ultimate branches narrower and slightly smaller; leaf-tissue soft-herbaceous, dark green above, lightly sclerotic-striate beneath. Median leaves rigid, mostly 2.5–3 mm. long, carinate, ovate, abruptly acuminate-cuspidate (the cusp much shorter than the blade), the margins narrowly sclerotic, ciliate, the cilia oblique, about 0.08 mm. long. Spikes very numerous, borne singly or in pairs on the ultimate branches, 4–10 mm. long; sporophylls subequal, ovate-acuminate, rigidly ciliate-denticulate, up to 2.5 mm. long.

Wet mountain forests, in deep shade, at middle and upper elevations, Porto Rico. Reported also from Martinique.

6. *Selaginella albonitens* Spring, Bull. Acad. Sci. Brux. 10: 139. 1843; Mém. Acad. Sci. Belg. 24¹: 80. 1849.

? *Selaginella mollis* Fée, Mém. Foug. 11: 133. 1866.

Selaginella albonitens longiciliata Hieron. Hedwigia 58: 313. 1917.

Stems 6–14 cm. long, decumbent, 0.2–0.5 mm. thick, subflexuous, producing capillary rooting rhizophores at the lower nodes, often bipartite near the base, otherwise 2-pinnate, or simply pinnate at the attenuate ascending apex, the frond usually oblong or subovate in outline; branches laxly assurgent, the larger ones 2–5 cm. long, the divisions few, short, laxly oblique, simple or forked; plane of the stem and main branches 4–6 mm. broad (leaves included), of the minor branches 3–4 mm. Lateral leaves of stem and main branches spreading, half their width apart or more, 2–3 mm. long, 0.8–1.5 mm. broad, elliptic-oblong to ovate-oblong, acutish, inequilateral, obliquely attached, rounded and somewhat incumbent at upper base, here lightly sclerotic-marginate and sparsely ciliate (cilia 0.05–0.07 mm. long), or more strongly marginate throughout and ciliate at upper and lower base (cilia 0.1–0.2 mm. long), ciliolate-denticulate beyond; lateral leaves of minor branches narrower, shorter, less rounded at upper base; leaf-tissue fragile, membranous-herbaceous, light green, pale and distinctly sclerotic-striate beneath, pellucid. Median leaves subdistant, 1.5–2.2 mm. long, 0.5–0.9 mm. broad, mostly obovate, abruptly acuminate-aristate at apex, the awn sclerotic, one-third to two-thirds as long as the blade; margins ciliolate. Spikes numerous, assurgent, 4–9 mm. long; sporophylls subequal, 1–1.6 mm. long, 0.5–0.7 mm. broad, difform, ovate-acuminate and cymbiform, or narrow, long-acuminate, and sharply carinate; margins rigidly ciliolate-denticulate.

Moist shady banks, at lower and middle elevations, Porto Rico:—Jamaica; Cuba; Hispaniola; St. Kitts; Guadeloupe; Montserrat. Attributed also to other islands of the Lesser Antilles.

7. *Selaginella Sintenisii* Hieron. Hedwigia 58: 299. 1917.

Stems 5–20 cm. long, ascending, rhizophorous and rooting only at the suberect base, 0.3–0.5 mm. thick, sometimes branching from the base and decompound (the frond subdeltoid), or simply pinnate above the base, 2-pinnate upward, the frond subovate to oblong; branches oblique-spreading, subdistant, short, the largest 4–5 cm. long, with 2–5 short divaricate divisions (5–15 mm. long), these simple or forked; plane of the upper stem and main branches 5–7 mm. broad (leaves included), of the minor branches 4–5 mm. Lateral leaves of upper stem and main branches spreading, approximate, 2.5–3.5 mm. long, 1–1.5 mm. broad, obliquely oblong-ovate to elliptic-oblong, acute, inequilateral, obliquely attached, broadly rounded at the slightly incumbent upper base, here sparsely ciliate (cilia 0.1–0.14 mm. long), ciliolate-denticulate beyond, the lower margin subentire; lateral leaves of minor branches slightly shorter and narrower, elliptic-oblong; leaf-tissue thin-herbaceous, dark green above, paler and distinctly sclerotic-striate beneath. Median leaves of upper stem and main branches approximate, 2–3 mm. long, 0.7–1.2 mm. broad, elliptic-ovate, subcarinate, the apex attenuate-subulate, rigidly conduplicate, one-third as long as the blade; margins sparsely ciliolate throughout. Spikes terminal, solitary, 3–10 mm. long; sporophylls ovate-cymbiform, evenly long-acuminate, sharply carinate, 1.2–1.5 mm. long, ciliolate-denticulate above the base.

Moist rocky forests, at middle elevations, Porto Rico:—Jamaica; Cuba.

8. *Selaginella laxifolia* Baker, Bot. Jahrb. Engler 24: 151. 1897.

Stems 10–30 cm. long, laxly ascending and somewhat recurved, bearing a few weak rhizophores at extreme base, 0.5–1 mm. thick, stramineous, nearly straight, with numerous laxly oblique, decrescent, mostly 1–2-pinnate lateral branches

frondose, the whole oblong to narrowly obovate in outline; lateral branches alternate, subimbricate, the basal ones short and simple, the middle ones narrowly triangular, elongate, 4–8 cm. long, the ultimate divisions few, distant, lax, mostly 4–10 mm. long; plane of stem and main branches 3–4 mm. broad (leaves included), of the minor divisions 2–3 mm. Lateral leaves of stem and main branches their width apart or more, oblique-spreading, 1.7–2.5 mm. long, 1–1.6 mm. broad, obliquely ovate-oblong, acute at apex, subcordate at the pulvinate base, not auriculate, strongly costate, the margins narrowly sclerotic throughout, minutely and rigidly ciliolate-denticulate (teeth 0.02–0.05 mm. long); lateral leaves of minor divisions similar but smaller; leaf-tissue thin-herbaceous, usually pale but lustrous in drying. Median leaves adjacent or subimbricate, 1–1.5 mm. long, broadly ovate, abruptly long-acuminate, the margins narrowly sclerotic, minutely ciliolate (cilia about 0.04 mm. long). Spikes numerous, solitary, terminal, 2–4 mm. long; sporophylls cymbiform-ovate, sharply acute, carinate, minutely ciliolate, unequal, mostly 1–1.4 mm. long.

Shady banks, at lower and middle elevations, Porto Rico; not uncommon:—Reported from Jamaica, probably in error.

9. *Selaginella cordifolia* (Desv.) Spring, Bull. Acad. Sci. Brux. 10: 228. 1843; Mém. Acad. Sci. Belg. 24¹: 103. 1849.

Lycopodium cordifolium Desv. in Lam. Encycl. Suppl. 3: 548. 1813.

Stems 12–30 cm. long, procumbent or laxly ascending and recurved, usually producing rhizophores only at base and apex, weak, 0.2–0.5 mm. thick, not flexuous, with many short, laxly ascending, contiguous to subdistant, decrescent lateral branches below the attenuate or flagelliform apex, the frond thus narrowly elongate-triangular; branches alternate, the basal ones 3–6 cm. long, elongate-triangular, lax, distantly pinnate or 2-pinnate, the ultimate divisions very few, 2–6 mm. long; plane of upper stem and main branches 4–6 mm. broad (leaves included), of the minor divisions 2–3 mm. Lateral leaves of stem and main branches nearly or quite their width apart, oblique-spreading, broadly cordate-oblong, 2.5–4 mm. long, 1.5–2 mm. broad, abruptly acute and mucronulate at apex, narrowly sclerotic, obliquely affixed, not auriculate, costate beneath, the margins laxly ciliate at the broadly rounded, incumbent upper base (cilia spreading, 0.15–0.4 mm. long) and sparsely so to the middle or beyond, minutely denticulate-ciliolate elsewhere; lateral leaves of minor divisions similar but smaller; leaf-tissue membrano-herbaceous, pale, pellucid, lustrous. Median leaves subimbricate, 1.5–2 mm. long, oval-ovate, abruptly acuminate-cuspidate, subcarinate, the margins sclerotic and rigidly ciliate throughout (cilia 0.06–0.12 mm. long, spreading). Spikes few, 2–4 mm. long, thick, solitary; sporophylls laxly oblique, narrowly triangular-ovate, evenly acuminate, about 1.5 mm. long, acutely carinate, the margins narrowly sclerotic, obliquely ciliolate.

Moist shady banks, at lower and middle elevations, Porto Rico:—Cuba; Hispaniola.

Selaginella Willdenovii (Desv.) Baker, a rather coarse, clambering plant of Asia and the East Indies, common in cultivation, has apparently escaped near Mayaguez and Rio Piedras, Porto Rico, as also in Trinidad. Cultivated specimens are at hand from St. Thomas.

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VOLUME I (complete in four parts with index).

- Part 1. History of the Survey by N. L. Britton.
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- Part 4. Descriptive Flora—Spermatophyta (Continued).

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- Part 1. Descriptive Flora—Spermatophyta (Continued).
- Part 2. Descriptive Flora—Spermatophyta (Continued).
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SUPPLEMENT TO DESCRIPTIVE FLORA— SPERMATOPHYTA

BY N. L. BRITTON AND PERCY WILSON

On the following pages we have brought together notes and observations yielded by field, library and herbarium study since the publication of Volume VI, Part 3, in 1926, up to October, 1930. The introduction of economic and ornamental plants by the Agricultural Experiment Stations, by the Forest Service, by Mr. Arthur S. Fairchild at Louisenhøj, St. Thomas, and on many estates have added numerous species, and the growth or failure of many previous introductions have been observed. We gratefully record coöperation in these studies by Mr. D. W. May, Director, and Mr. T. B. McClelland, Horticulturist, of the United States Agricultural Experiment Station, Mayaguez; by Mr. Lyster H. Dewey, botanist in charge of Fiber Plants; by Hon. Carlos E. Chardon, Commissioner of Agriculture and Labor, and Mr. Otis W. Barrett, Director of Agriculture; by Mr. W. P. Kramer, Chief Forester of the Forest Service; and by Mr. C. B. Thompson, Director of the St. Croix Agricultural Experiment Station. Introductions at these stations were largely from the Bureau of Plant Industry.

All the experimental plantations in Porto Rico and St. Croix were largely devastated by the destructive hurricane of September 13, 1928, many species under observation being destroyed, and valuable introductions of economic and ornamental plants thus eliminated or damaged, which otherwise might have been established. Some of these last have been again introduced, and many additional species experimentally planted.

Vol. V, p. 9, add **Pandanus odoratissimus** L. f., Australasian, introduced at the St. Croix Agricultural Experiment Station in 1929, and reported by Mr. Thompson as about 3 dm. high in April, 1930, has green, long-tipped leaves, their margins with short, white spines.

Vol. V, p. 11, **Potamogeton epihydrus**, add note, the plant of Porto Rico, which was collected in 1885 between Aguas Buenas and Caguas by Sintenis, and not otherwise known, has been described as a distinct, endemic species, **Potamogeton insulanus** Hagstr. Kgl. Sw. Vet. Akad. Handl. 55^b: 154. 1916.

Vol. V, p. 15, **Sagittaria lancifolia**, add, illustrated in Addisonia, plate 406.

Vol. V, p. 22, add **Saccharum spontaneum** L., Indian, a tall grass with narrow leaves, was introduced at the St. Croix Experiment Station for sugar-cane breeding work.

Vol. V, p. 24, **Schizachyrium gracile**, add locality, bare limestone near Cape Borinquen, 1929.

Vol. V, p. 29, add **Holcus sudanensis** (Piper) Bailey, SUDAN GRASS, was introduced at the Agricultural Experiment Station, Mayaguez, made rapid growth for several years, and was distributed, appearing to be adapted as a forage grass, to the dry, southern districts of Porto Rico, but was attacked by the fungus *Puccinia purpurea* Cooke.

Vol. V, p. 35, **Eriochloa subglabra**, the older name is **Eriochloa polystachya** H. B. K. Nov. Gen. 1: 95. 1816.

Vol. V, pp. 36-41. The monograph of "The North American Species of *Paspalum*" by Mrs. Agnes Chase (Contr. U. S. Nat. Herb. 28: Part 1, 1929) contains information which modifies former conclusions about species of **Paspalum**, as follows:

p. 37. **Paspalum melanospermum**. Our grass is referred to **Paspalum Boscianum** Fluegge, Mon. Pas. p. 170, 1810, where it had previously been included by Mr. George V. Nash. The range of **P. Boscianum** extends from Pennsylvania to Florida and Louisiana, and it is also recorded from Guatemala, Panama, St. Thomas and Brazil. *P. melanospermum* is closely related, ranging from Guadalupe southward into South America.

p. 38. **Paspalum Leoninum** Chase, is now regarded as the same as **Paspalum rupestre** Trin.

p. 38. **Paspalum Poiretii** R. & S. Substitute for this name **Paspalum Saugetii** Chase, loc. cit. 147. *P. Poiretii* proves to be a synonym of *P. caespitosum* Fluegge, as also *P. gracile* Poir.

p. 38. **Paspalum portoricense** Nash, substitute for this name, **Paspalum molle** Poir. (see p. 41), as determined by Mrs. Chase after examination of Poiret's type specimen from St. Thomas, preserved in the herbarium of Lamarck at Paris.

p. 39. **Paspalum Simpsoni** Nash. This species is now referred to **Paspalum Blodgettii** Chapm. Fl. South. U. S. 571. 1860. The type specimen of *P. Blodgettii* has, however, not been located by subsequent students and the identity of the two is therefore in doubt; it has been regarded by some students as the same as *P. caespitosum*.

p. 39. **Paspalum glabrum** Poir. The older name is **Paspalum laxum** Lam. Tabl. Encycl. 1: 176. 1791.

p. 39. **Paspalum propinquum** Nash. The specimen recorded from St. Thomas on p. 41, as *P. spathaceum*, proves to be this species.

p. 40. **Paspalum notatum** is reported by Mr. Thompson as introduced on St. Croix under the name BAHIA GRASS.

Vol. V, p. 57. **Pennisetum Ruppellii** Steud., CRIMSON FOUNTAIN GRASS, Abyssinian, introduced at the St. Croix Experiment Station in 1928, is a tall grass with crimson inflorescence 1-1.5 dm. long.

Vol. V, p. 57, add **Pennisetum macrostachyum** (Brongn.) Trin., East Indian, cultivated at Louisenhøj, St. Thomas, in 1929, is a tall grass with dark purple spikes 2-3 dm. long.

Pennisetum ciliare, add note, this grass, observed formerly on limestone hills near Ponce, was exceedingly abundant at the same locality in 1930, occupying large areas on La Vijia.

Vol. V, p. 75. **Eragrostis Elliottii**, add locality, white sand along Loiza Road, 1929.

Vol. V, p. 77, add **Bambos Tulda** Roxb., native of British India, introduced at the Forest Station, Rio Piedras, 1926-1927 and recorded as thrifty in 1929, becomes 15-20 m. high, the stems white-fringed below the nodes, the leaves linear to lanceolate, 1.5-3 dm. long.

Arundinaria japonica Sieb. & Zucc., observed by Mr. J. A. Stevenson planted at Bayamon, Porto Rico, in 1916, has not since been reported.

Melinis minutiflora, add record, cultivated also on St. Croix.

Tripsacum latifolium, the cultivation of this grass was not continued at Mayaguez, **Tripsacum laxum** proving to be more valuable for forage, and has become much used in Porto Rico.

Tricholaena rosea was observed cultivated in St. Thomas in 1926, and also near Sardinera, Porto Rico, where this grass was abundant in a white sand field in 1927, and was also established near Manati, and Candelaria.

Polytrias amaura, add record, the JAVA GRASS, proved well adapted to Porto Rico conditions, and had been widely distributed from the Mayaguez Experiment Station, and introduced into St. Croix.

Vol. V, p. 78. **Hyparrhenia rufa**, add note, the cultivation of this grass was not continued at Mayaguez.

Vol. V, p. 78, add at end of POACEAE, **Koeleria setacea** DC. grown at the Forest Station, Rio Piedras, in 1926, from seed received from the Bureau of Plant Industry, is a grass native of northern Europe.

Thyrsostachys siamensis Gamble, a grass native of Burma and Siam, is also recorded as grown from seed at the Forest Station at the same time, but not established.

Osterdamia tenuifolia (Willd.) Kuntze, VELVET GRASS, Asiatic, reported by Mr. Thompson as introduced into St. Croix in 1927, is a low perennial grass, with linear-filiform, short leaves, the spikelets in terminal spike-like panicles (*Zoysia tenuifolia* Trin.).

Eremochloa ophiuroides Hack., Chinese, introduced at the St. Croix Experiment Station in 1930, is a grass with nearly erect culms 12-15 cm. long, the slender racemes 4-5 cm. long, the spikes 4 mm. long.

Dendrocalamus giganteus Munro, the GIANT BAMBOO of the East Indies, is reported by Mr. McClelland introduced in 1930, as seedlings, at the Mayaguez Experiment Station, from the Panama Canal Zone Plant Introduction Garden.

Vol. V, p. 79. **Kyllinga pungens**, add locality, Luquillo Road, Porto Rico, 1927.

Vol. V, p. 83. **Cyperus elegans**, add note, extends inland along a stream near Guayama, to much above saline influence.

Vol. V, p. 87. **Cyperus ligularis**, add note, abundant on the top of a dry white sand ridge near Sardinera, Porto Rico, 1927, much beyond saline influence.

Vol. V, p. 88. **Cyperus planifolius**, add locality, border of mangroves, Bahia Puerco, near Ceiba, eastern coast of Porto Rico.

Vol. V, p. 92. **Eleocharis microcarpa**. The plant found on St. Thomas by Eggers and recorded under this name by Clarke, proves to be a distinct species, **Eleocharis minutiflora** Boeckl. Bot. Jahrb. 7: 274. 1886. (According to Kükenthal, Repert. Sp. Nov. 23: 194.)

Vol. V, p. 93, add **Eleocharis radicans** (Poir.) Kunth, Enum. 2: 142. 1837. *Scirpus radicans* Poir. in Lam. Encycl. 6: 751. 1804. (Not *S. radicans* Schkuhr. 1793.)

Eleocharis acicularis radicans Britton, Journ. N. Y. Micros. Soc. **5**: 105. 1889.

This plant is not definitely known to us; it was described from specimens recorded as collected in Porto Rico prior to 1804, by Ledru. It has apparently been misunderstood by authors.

Vol. V, p. 93, add 3. **Stenophyllus pauciflorus** (Liebm.) Britton.

Oncostylis pauciflora Liebm. Vid. Selsk. Skr. W. 2: 241. 1851.

Bulbostylis pauciflora Clarke, Kew Bull. Add. Ser. **8**: 26. 1908.

Culms tufted, setiform, tetragonus, scabrous, about 3 dm. high. Leaves erect, setaceous, pungent, scabrous, shorter than the culm, their membranous sheaths compressed, striate, pilose at the mouth; spikelet solitary, sessile, 6-8 mm. long, ovate-lanceolate, compressed, few-flowered; bracts 2, one of them 1-2 cm. long, the other much shorter; scales elongated-lanceolate, 4 mm. long, 1-nerved, mucronulate, dark brown with hyaline margins; stamens 3; achene obovoid, trigonus, obtuse, black-tuberculate and transversely undulate; style 3-cleft, about as long as the achene.

Stony Ground, St. Croix. Endemic.

We are indebted to Professors C. H. Ostenfeld and Ove Paulson of the Botanical Museum at Copenhagen for photographs and specimens of this rare plant. Its original description was published in a paper on Mexican sedges.

Vol. V, p. 105. **Rynchospora Marisculus** Lindl. & Nees, add locality, Cidra, Porto Rico (Anna E. Perkins, Feb. 1928).

Vol. V, p. 109, **Scleria Grisebachii** Clarke. According to Kükenthal the prior name for this species is **Scleria Eggersiana** Boeckl. Cyp. Nov. 2: 41. 1890.

Vol. V, p. 111, nineteenth line of key, for apex, read base.

Vol. V, p. 113, **Euterpe globosa**, add note, descends to about 450 m. in a wooded arroyo near Cidra, observed in March, 1927.

Vol. V, p. 115, **Acrocomia aculeata**, reported by Mr. J. B. Thompson as brought from St. Thomas to St. Croix in 1930.

Cocos nucifera, add note, recent discussions of the origin of the COCONUT, indicate that this was more probably in the Old World tropics than in the American. Reference is made to Dr. J. K. Small's paper (Journal, N. Y. Botanical Garden **30**: 153. 1930).

Cocos plumosa, add note, this palm has been found to be generically distinct from the COCONUT and its classification improved under the name **Arecastrum Romanzoffianum** (Cham.) Beccari.

Vol. V, p. 116, **Sabal Blackburnianum**, add record, introduced at the Forest Station, Rio Piedras, but not established.

Vol. V, p. 116, add **Sabal Palmetto** (Walt.) Lodd., the PALMETTO of the southeastern United States and the Bahama Islands, was seen as seedlings at the Mayaguez Experiment Station in December 1929, germinated from seed of 1928, sent from the New York Botanical Garden.

Vol. V, p. 117, add **Thrinax Wendlandiana** Beccari, Cuban, introduced at the St. Croix Experiment Station in 1929, is a tall palm, with pedicelled flowers and fruit.

Vol. V, p. 118, **Corypha elata**. This elegant palm in the Mayaguez collection was destroyed by the hurricane of September, 1928.

Phoenix canariensis, add record, introduced also at the Forest Station, Rio Piedras, and thrifty as young plants in 1927; introduced also at the St. Croix Experiment Station in 1927 and thrifty in 1930.

Vol. V, p. 118, add **Phoenix pusilla** Gaertn. (*P. farinifera* Roxb.) a low species of southern India, and **P. sylvestris** Roxb. a tall Indian palm, related to *P. dactylifera*, the DATE PALM, are reported by Mr. Thompson as grown from seed at the St. Croix Experiment Station in 1929, with healthy seedlings in April, 1930.

Vol. V, p. 118, **Butia capitata**, add record, this Brazilian palm was thrifty for a time, but ultimately succumbed.

Livistona rotundifolia Mart., native of Java, grown as young plants at the Forest Station, Rio Piedras, and reported as thrifty in 1929, is an orbicular-leaved palm, becoming about 16 m. high, the long petioles armed with recurved spines, 2-4 cm. long, the blades 1-1.5 m. in diameter, their segments 2-cleft.

Livistona australis (R. Br.) Mart. (*Corypha australis* R. Br.), Australian, grown from seed at the St. Croix Experiment Station in 1929, is a slender palm, with palmate leaves, their narrow segments long, acuminate. This palm becomes 25 m. high; its globose fruit is 12-18 mm. in diameter, the pericarp hard and crustaceous when dry.

Archontophoenix Alexandrae (F. Muell.) Wendl. & Drude, an unarmed, pinnate-leaved palm, becoming about 25 m. high in Australia, grown by the Forest Service in 1927 and recorded as thrifty, has leaves about 2 m. long with many narrow, acuminate segments. (*Ptychosperma Alexandrae* F. Muell.)

Vol. V, p. 119, **Caryota mitis**, Mr. Thompson reports that one of the seedlings seen at the St. Croix Experiment Station in 1923 had attained a height of about 2.5 m. in 1930. It is a palm with pinnate leaves, its globose fruit flat-topped, purple, about 12 mm. in diameter.

Arenga saccharifera, add record, grown also at the St. Croix Experiment Station, introduced in 1928; plants 1 m. high recorded in 1930.

Howea Belmoreana, add record, grown at the St. Croix Station from seed of 1928; seedlings reported in 1930.

Neowashingtonia filifera, add record, grown also at the Forest Station, Rio Piedras, in 1928, and recorded as thrifty.

Neowashingtonia sonorae (S. Wats.) Rose, native of northern Mexico, was grown as young plants at the Forest Station, Rio Piedras in 1928, and recorded as thrifty. It is a fan-leaved palm, similar to the preceding species.

Borassus flabellifer, add record, grown from seed at the St. Croix Agricultural Experiment Station in 1927, the young plants thrifty in 1930; it is a tall unarmed palm, with flabellate leaves, native of India.

Vol. V, p. 120, add **Latania Verschaffeltii** Lem., reported from the collection at the Mayaguez Experiment Station in 1929, is a native of Rodriguez Island. It forms a trunk 6-10 m. high, the suborbicular light green leaves about 1.5 m. long, their segments acuminate; the petioles are somewhat longer than the leaves, tomentose, their margins orange; the fruit is slightly 3-angled, about 5 cm. long. (*Latania aurea* Duncan.)

Areca Catechu, add record, introduced into St. Croix from Guam in 1929.

Corypha Gabanga Blume, Malayan, a pinnate-leaved palm, with smooth, ellipsoid fruit, was reported by Mr. Thompson as grown from seed at the St. Croix Experiment Station in 1929.

Daemonorops melanochaetes Blume, Malayan, and **D. palembanicus** Blume, Sumatran, also reported grown from seed at the St. Croix Station in 1929, are slender palms with pinnate leaves and pedicelled flowers.

Chamaerops humilis L. of the Mediterranean region, the only native European palm, has short stems 3-4.5 dm. high, and palmate leaves, the petioles

armed with stout, straight or hooked spines; it was introduced at the St. Croix Experiment Station in 1929.

Calypstrocalyx spicatus (Lam.) Blume, introduced at the Trujillo Plant Propagation Station in 1927, was destroyed by the hurricane of September, 1928. It is native of Amboina, forming a trunk 6–12 m. high, the large leaves pinnate.

Attalea Cohune Mart., COHUNE PALM, received at the Forest Station from the United States Bureau of Plant Industry in 1927, but not established, is native of Honduras. It has long pinnate leaves with about 60 narrow segments. Introduced also from the same source at the St. Croix Experiment Station in 1926 and reported thrifty in 1930.

Saguerus mindorensis (Beccari) O. F. Cook, introduced at the Agricultural Experiment Station, Mayaguez in 1916, grew luxuriantly and was represented there by two fine large plants in 1929; it is a pinnate-leaved palm 2–3 m. high, native of the Philippine Islands.

Acanthorhiza Warscewiczii H. Wendl. of Panama, introduced at the Trujillo Plant Propagation Station in 1927, was established and healthy in February, 1930. It is a tall slender palm, the trunk densely spiny for some distance above the base, the orbicular leaves with many narrow segments.

Heterospathe elata Scheff., raised from seed at the Trujillo Station in 1928, and reported as established in March, 1930, is native of Amboina, where it forms a tree, the trunk slender and unarmed, the pinnate leaves with many linear, acuminate segments.

Martinezia caryotaefolia, add note, this palm has been segregated from the genus *Martinezia*, as the type of a new genus **Tilmia**, its name thus becoming **Tilmia caryotaefolia** (H. B. K.) O. F. Cook. Trees were seen again at Mayaguez in December, 1929.

Linoma alba (Bory) O. F. Cook, MASCANENE CABBAGE PALM, received as seedlings by the Forest Service from the Bureau of Plant Industry in 1926, failed to establish themselves (*Areca alba* Bory).

Trachycarpus Fortunei H. Wendl. a species of eastern Asia, reported by Mr. Thompson as introduced at the St. Croix Experiment Station in 1929, is a stout palm, with suborbicular leaves, branched flower clusters and small umbilicate fruit.

Vol. V, p. 120, **Carludovica palmata**, add record, introduced into St. Croix in 1928; Mr. Thompson reported plants 2 m. high at the Experiment Station in 1930.

Vol. V, p. 124, add **Philodendron Fendleri** Krause, a species with deeply lobed leaves, their lobes obtuse, was brought by Mr. Otis W. Barrett to the Trujillo Plant Propagation Station, from Trinidad or Barbadoes, in 1927, and reported as vigorous in 1930.

Vol. V, p. 129, **Anthurium acaule**, add Porto Rico, English name LACE-LEAF, from the skeleton of the leaf, through weathering, becoming lace-like.

Vol. V, p. 130, add **Syngonium auritum** (L.) Schott., a native of Hispaniola and Jamaica, is occasionally planted in gardens on St. Thomas. It is a high-climbing aroid with milky juice, the long-petioled leaves 5-parted.

Vol. V, p. 144, add at end of BROMELIACEAE, **Neoglaziovia variegata** (Ait.) Mez, CAROA, a Brazilian fibre-plant, introduced at the Mayaguez Experiment Station in 1926, is reported by Mr. Dewey to be healthy, with leaves 3–4 dm. long in 1930. Its leaves are narrowly linear, about 1.5 cm. wide, spinulose-margined, the inflorescence racemose, on a scape shorter than the leaves (*Bromelia variegata* Ait.).

Vol. V, p. 150, **Cordyline guineensis** add, races of this species were grown in quantity by Mr. Pennock in his commercial nursery at Sabana Llana, Porto Rico, 1929-1930; one of these, reported by Mr. Pennock as a bud-sport, has narrow, stiff, gray-green leaves with numerous parallel, closely approximate veins.

Cordyline zeylanica (Willd.) Britton, the leaves with broad yellow marginal bands and variously mottled, is commercially grown at Sabana Llana, and is occasional in gardens. (*Sansevieria zeylanica* Willd.; *S. Laurentii* Wildem.)

Vol. V, p. 152. Vol. VI, p. 337. **Dracaena Draco**, add record, grown from seed at the St. Croix Experiment Station in 1927; plants 6 dm. high reported in 1930.

Vol. V, p. 153, add at end of LILIACEAE, **Ornithogalum caudatum** Ait., South African, brought by Mr. Fairchild to Louisenhøj, St. Thomas, and established there, has ovoid bulbs 1 dm. thick, fleshy leaves 4-6 dm. long and 3-4 cm. wide, the inflorescence a dense raceme up to about 3 dm. long, of greenish-white flowers 8 mm. long.

Dianella coerulea Sims, sent to the Forest Service from the Chapman Field Station, Florida, by the Bureau of Plant Industry but not established, is an ornamental herbaceous perennial, 1-2 m. high, with distichous, linear leaves, and pale blue flowers in terminal corymbs.

Lilium auratum Lindl., GOLDEN-BANDED LILY, grown in the Governor's Garden, Rio Piedras, in 1930, is 1-2 m. high, with many lanceolate leaves, the large fragrant flowers white, crimson-spotted, the segments with a yellow, longitudinal median band.

Nolina recurvata (Lem.) Hemsl., Mexican, introduced a number of years ago at the Trujillo Plant Propagation Station and growing luxuriantly in shade there in 1930, has a large, woody, subglobose trunk, which may become 2 m. high, topped by many stiff, linear, recurved, glabrous leaves, 6-10 dm. long; when blooming this forms a terminal panicle about 1 m. high, the corolla about 3 mm. long.

Add at end of LILIACEAE, **Mondo japonicum** (Thunb.) Farwell, ALMA-HODA DE PASTOR, LILY-TURF, native of Japan and Korea, introduced some years ago from Spain by Don Lorenzo Oliver at Arecibo, Porto Rico, and seen growing luxuriantly there in dense borders along his flower-garden paths, is a low, glabrous perennial, propagating freely by stolons, with narrowly linear leaves, 1.5-3 dm. long, curved and blunt. It forms an elastic green turf or sod, and has not been observed in bloom at Arecibo; when flowers are produced, they are borne on scapes shorter than the leaves, and thus sometimes overlooked; the campanulate, light-lilac flowers are racemose, short-pedicelled, nodding, 4-6 mm. broad, and the blue fruit is about 8 mm. in diameter. We are indebted to Professor L. H. Bailey for identification of this interesting plant. (*Convallaria japonica* Thunb., *Ophiopogon japonicus* Ker.)

Vol. V, p. 157, add **Agave albicans** Jacobi, with short, white-glaucous, oblanceolate leaves, and **Agave lophantha** Schiede, with long green, horny-margined leaves, both Mexican, are reported by Mr. Thompson as grown from seed at the St. Croix Experiment Station in 1929, the seedlings healthy in April, 1930.

Agave antillarum Trelease, reported by Mr. A. S. Fairchild as introduced at Louisenhøj, St. Thomas, in 1923, and well established by 1929, is native of Hispaniola. It has leaves with a more slender terminal spine than in the native species and its orange flowers are shorter-pedicelled.

Vol. V, p. 157, **Agave sisalana**, add record, Mr. Dewey states that the first introduction of SISAL into Porto Rico was in 1902, at the Mayaguez Experiment Station.

Agave fourcroydes, add record, the first introduction of HENNEQUEN was in 1904, also at Mayaguez.

Several other species of **Agave** have been introduced from time to time, but have either failed to establish themselves or their identity has been lost.

Vol. V, p. 158, **Furcraea macrophylla**, add record, Mr. Dewey reports this as first introduced at Mayaguez in 1917, persistent and vigorous in 1930.

Furcraea gigantea Vent., experimentally introduced by the Mayaguez Station in 1904, grew luxuriantly, but as there was no satisfactory method of preparing the fiber, the plants were destroyed.

Atamosco tubispatha, add note, abundant in old fields near Isabella and Aguadilla, Porto Rico, in flower March 24, 1927.

Vol. V, p. 159, add **Atamosco Eggersiana** (Urban) Britton, reported by Mr. A. S. Fairchild as grown in St. Thomas gardens in 1929, has bright yellow flowers; it is wild in Hispaniola and in Cuba. (*Zephyranthes Eggersiana* Urban.)

Vol. V, p. 160, add **Crinum asiaticum** L., of tropical Asia, seen in Miss Noble's garden, Condado, in 1929, has long bulbs, many leaves up to nearly 1 m. in length, the numerous flowers pure white, the slender perianth-tube straight, 7-8 cm. long, the linear segments about as long, the filaments 5 cm. long, red above. Mr. Fairchild reports it as grown at Louisenhöj, St. Thomas, from seed brought from Spain in 1923.

Vol. V, p. 161, add **Hymenocallis tubiflora** Salisb., sent by A. Nelthropp from St. Thomas in 1928, has long-petioled oblong leaves, the flowers with a very slender perianth-tube about 2 dm. long, the perianth-segments narrow. It is native of northern South America.

E. cycles sylvestris Salisb., native of the Malay Peninsula, Philippines, and North Australia, has been in cultivation on St. Croix and St. Thomas under the name INDIAN LILY. It is an herb with a tunicated bulb 8-10 cm. in diameter, the large cordate-orbicular leaves sometimes 2.8 dm. wide, the white flowers borne in dense umbels on short pedicels. This is the plant referred to in Vol. VI, p. 337, as apparently a species of *Niobe*.

Vol. V, p. 161, add at end of AMARYLLIDACEAE, **Doryanthes Palmeri** W. Hill, Australian, has a basal tuft of narrow leaves about 2 m. long, entire, the outer recurved, the inner erect, all with brown tubular tips; the flowering stem is 7-8 m. high, topped by a panicle of scarlet flowers. Mr. Thompson reports a small plant at the St. Croix Experiment Station in 1930, raised from seed germinated in 1928.

Eucharis candida Planch., is native of Colombia. A plant grown under this name by the Porto Rico Department of Agriculture and Labor in 1925, and transmitted to the New York Botanical Garden, differs from the original description and illustration of this species (*Flore des Serres* 8: 107, pl. 788) in having narrower leaves and smaller flowers.

Vol. V, p. 161, add at end of AMARYLLIDACEAE, **Cooperia pedunculata** Herb., GIANT PRAIRIE LILY, Texan, grown at Louisenhöj, St. Thomas, from seed of 1923, has small, long-necked bulbs, narrow, linear leaves 1-3 dm. long, the solitary flower nearly white, 7-8 cm. long, borne on a scape 1-2 dm. long, the slender perianth-tube about as long as the ovate lobes.

Vol. V, p. 163, add 4 a, **Dioscorea rotundata** Poir. in Lam. Encycl. Suppl. 3:139. 1813. [*Dioscorea occidentalis* R. Knuth., *Pflanzenreich* 4⁴³:299. 1924.]

A glabrous vine, the stems often terete. Leaves opposite, the blades sub-orbicular to orbicular, 6-11.5 cm. long, 5.5-10 cm. broad, abruptly long-acuminate at the apex, cordate at the base, 5-7-nerved, chartaceous; petioles 4.5-7.5 cm.

long; staminate spikes 1-6 at the nodes; perianth-segments broadly ovate, 1.3-1.5 mm. long, 1.5 mm. broad; stamens 6; pistillate flowers and fruit not described.

Porto Rico; collected many years ago by Riedlé, according to Knuth:—Jamaica; St. Vincent, Guadeloupe; Martinique; Trinidad; Brazil.

4b. *Dioscorea bulbifera* L. Sp. Pl. 1033. 1753.

A glabrous vine, the stems often grooved. Leaves alternate, the blades ovate to suborbicular, 7-19 cm. long, 5-15 cm. broad, long-acuminate at the apex, deeply cordate at the base, about 9-nerved, membranous; petioles rather slender, 4-14 cm. long; staminate flowers in short, fascicled spikes, the perianth-segments linear, 2 mm. long, 0.6-0.7 mm. broad, the stamens 6; pistillate flowers in long slender fascicled spikes; capsule oblong, 2.2-2.5 cm. long, 1.2-1.5 cm. broad.

Porto Rico (according to Knuth), perhaps persistent after cultivation:—Cuba; Guadeloupe; Mexico; Central and South America. Native of the Old World tropics.

Vol. V, p. 165, *Xiphidium coeruleum*, add locality: wet shaded bank, Quebrada Arenas between Toa Alta and Corozal, Porto Rico, February, 1927; a plant flowered in Miss Noble's garden, Condado, in 1928.

Vol. V, p. 167, at end of IRIDACEAE, add **TRIMEZA** Salisb. Trans. Hort. Soc. 1: 308. 1812.

Herbs with fibrous-coated bulbs, linear grass-like leaves, and slender, often few-flowered scapes. Perianth yellow, the tube none; segments very dissimilar, the outer obovate, the inner much smaller. Filaments erect, free. Ovary 3-celled; ovules many, superposed; style subulate at the base, the three branches ending in small tubercles or cusps that overlap the small horizontal stigmas. Capsule oblong, loculicidally 3-valved. Seeds small, often angled.

1. *Trimeza martinicensis* (Jacq.) Herb. Bot. Reg. 1844: Misc. 88. 1854.

Iris martinicensis Jacq. Enum. 12. 1760.

Cipura martinicensis H. B. K. Nov. Gen. 1: 321. 1816.

Bulb ovoid, the coats brown. Basal leaves several, linear, 3-4 dm. or more long, 5-11 mm. broad; stem rather slender, 1.5-5.5 dm. tall, simple or sometimes forked; perianth bright yellow, the outer segments obovate, 1.5-2 cm. long, the inner much smaller; capsule oblong, 1-2 cm. long; seeds subglobose or angled, about 2 mm. long.

Naturalized in lawn, Villa Leon near Bayamon, Porto Rico, 1930; Mexico to Brazil; Jamaica; Lesser Antilles.

Vol. V, p. 167, at end of IRIDACEAE add *Tritonia crocosmaeflora* Lemoine, MONTBRIETIA, grown in 1927 by Mr. E. M. Verges, 2nd, at Maunabo, Porto Rico, is an erect branched plant, 7-10 dm. high, with narrow leaves and large orange-crimson flowers in racemes; it is an artificial hybrid between *Tritonia Pottii* and *Crocosmia aurea*, both of South Africa.

Vol. V, p. 173, add *Alpinia vittata* Bull, a decorative plant, 1 m. high or lower, with narrowly oblong, acuminate, glabrous leaves, 2-3 dm. long, green with white or yellowish stripes parallel with the veins, is occasionally grown for ornament in Porto Rico gardens. It is recorded as native of the South Sea Islands; its flowers have not been described, and its actual botanical relationship is not known.

Vol. V, p. 176, add at end of ALPINIACEAE, *Kaempferia Roscoeana* Wallich, East Indian, introduced on St. Thomas by Mr. Fairchild in 1925, received from Mr. Barrett, well established and distributed, is a low herb with tuberous roots, nearly orbicular, mottled leaves and large white, sessile flowers among the leaves.

Vol. V, p. 176, add at end of ALPINIACEAE, **Phaeomeria speciosa** (Blume) Merrill, PHILIPPINE WAX-PLANT, Malayan, grown from seed received from Manila in 1926, at the Agricultural Experiment Station at Mayaguez and luxuriant there in 1930, has leafy stems 5-6 m. high, the leaves oblong-lanceolate, glabrous, acuminate, 5-7 dm. long; the flowering scapes arc about 1 m. high, topped by a dense, capitate pinkish-bracted cluster of carmine flowers, the smaller, inner bracts red. (*Elettaria speciosa* Blume; *Phaeomeria imperialis* Lindl.)

Vol. V, p. 178, add **Calathea leopardina** (Bull.) Regel, (*Maranta leopardina* Bull.) Brazilian, sent from the New York Botanical Garden to Mr. Fairchild at Louisenhoj, St. Thomas, in 1923, well established there and distributed to other gardens, is an herb 3-4 dm. high, with long-petioled oblong or elliptic-lanceolate, glabrous leaves; the yellowish corolla-tube is about 1.5 cm. long, the oblong lobes 9 mm. long.

Vol. V, p. 180, **Burmanna capitata**, add to habitat, wet white sand, Laguna Tortuguero, detected in February, 1927.

Vol. V, p. 185, add **Vanilla Pompona** Schiede, native of the Lesser Antilles and northern South America, experimentally grown in Porto Rico, has larger flowers than those of **V. Vanilla**, the sepals oblong-lanceolate.

Vol. V, p. 188, **Beadlea cranichoides**, add locality, La Gloria, Sierra de Luquillo (Antonin Nechodoma, 1927).

Vol. V, p. 194, **Polystachya minuta**, add, illustrated in Addisonia, plate 234.

Vol. V, p. 198, **Encyclia papilionacea**, the prior name is **Encyclia bifida** (Aubl.) Britton & Wilson (*Epidendrum bifidum* Aubl. Hist. Guian. 2: 824. 1775). Strike out under this species the synonym *Epidendrum Krugii* Bello, and add:

4. **Encyclia Krugii** (Bello) Britton & Wilson.

Epidendrum Krugii Bello, Anales Soc. Esp. Hist. Nat. 12: 117. 1883.

Pseudobulbs similar to those of *E. bifida*, but mostly smaller. Leaves mostly narrower, often short; scape slender and simple; racemes few-several-flowered; bracts small; flowers smaller than those of *E. bifida*, the petals and sepals yellow or greenish-yellow, the tip white.

On shrubs, dry southwestern districts of Porto Rico, Endemic. The differences in flowers of this orchid from those of its relative have been beautifully portrayed in water-color paintings by Mrs. Horne.

Vol. V, p. 219; Vol. VI, p. 341, **Casuarina stricta**, add record, trees at the Forest Station had reached height of about 5 m. in 1928.

Vol. V, p. 221, **Piper citrifolium**, investigation of the type of this species, from French Guiana, by Professor Trelease, led him to conclude that the Porto Rico plant is distinct from it and thus better called **Piper Wydlerianum** (Miq.) C. DC.

Vol. V, p. 222, **Piper auritum**, add note, Professor Trelease ascertained that the specimens supposed to be from St. Thomas were really from Nicaragua.

Vol. V, p. 226, **Peperomia obtusifolia**, add, illustrated in Addisonia plate 50.

Vol. V, p. 227, **Peperomia dendrophila**, add note, the type of this species is from Jalapa, Mexico, and is regarded by Professor Trelease as distinct from the plant of Porto Rico, with which it was associated by Fawcett and Rendle in "Flora of Jamaica"; it is thus better called **Peperomia Sintenisii** C. DC.

Vol. V, p. 228, **Peperomia quadrifolia**, add distribution, also in the central mountains of Porto Rico.

Vol. V, p. 228, add, 19a, **Peperomia megalopoda** Trelease, sp. nov.

A small, assurgent, saxicolous herb, crisp-pubescent except for the spike. Stem thickened below, 2-3 x 30-40 mm., upcurved, with subalternate leaf-scars, the erect continuation filiform, denuded below; leaves 3 at a node, broadly elliptic, obtuse or bluntly subacuminate, mostly obtuse at base, 7-9 x 13-15 mm., dull, 3-nerved; petiole 2-4 mm. long; spikes terminal, slender, 100-130 mm. long, loosely flowered; peduncle 10 mm. long; bracts round-peltate; ovary subobovate; stigma oblique.

On shaded rock, between Guayama and Cayey, Porto Rico, at 300 m. altitude, December 5, 1929, Mrs. E. G. Britton 9352.

Vol. V, p. 232, the species of **Quercus** recorded, as introduced in 1922, all continued thrifty, **Quercus Lindleyana** was the most successful, reaching a height of 7 m. in 1930. **Quercus sootepensis** Craib. native of Siam, introduced at the same time, was also well established, becoming 6 m. high in 1930.

Castanea diversifolia was also successfully established, reaching 6 m. in height in 1930.

Vol. V, p. 233, **Juglans regia**, add record, the introduction of this tree was unsuccessful in Porto Rico, climatic conditions being unsuitable.

Hicoria Pecan, add record, this tree also failed to respond to the climate.

Vol. V, p. 237, **Ficus Sintenisii**, add Porto Rico name HIGUILLO PRIETA, communicated by Mr. C. Z. Bates; the range of this species extends to the northern coast, as shown by a tree observed at Laguna Tortuguero, March, 1930.

Vol. V, p. 238, **Ficus elastica**, add Porto Rico name, PALO DE GOME.

Vol. V, p. 238, **Ficus laevigata**, add Porto Rico name LECHESILLO.

Vol. V, p. 239, **Ficus serratus**, in the list of St. Thomas plants published by Krebs, was probably a misprint for the seaweed **Fucus serratus**.

Vol. V, p. 239; Vol. VI, p. 342, **Ficus Nekbuda**, add, the fruit, observed in March, 1927, is globose, about 1 cm. in diameter. This tree is luxuriant in Porto Rico and has been planted for shade and ornament at several places; it is also reported as introduced in St. Croix in 1928.

Vol. V, p. 239, add the following species of **Ficus** reported introduced at the St. Croix Experiment Station in 1928 and 1929:

Ficus altissima Blume, of tropical Asia, is a large tree with ovate or lanceolate leaves, the sessile axillary receptacles solitary.

Ficus capensis Thunb., South African, has glabrous or pubescent branches and ovate or ovate-elliptic, acuminate leaves, the receptacles obovoid or obovoid-globose.

Ficus mariannensis Merrill, of the Marianne Islands, is a tall, glabrous tree with oblong-elliptic chartaceous leaves, the fruit axillary, born on short peduncles; seed of 1928, made rapid growth.

Ficus platyphylla Delile, African, has oblong or obovate-oblong, long-petioled leaves, the receptacles peduncled.

Ficus Vogelii Miq. of tropical Africa, is a tree with oblong-elliptic or elliptic, obtusely-acuminate, coraceous leaves and sessile receptacles.

Ficus pseudopalma Blanco, NIOG-NIOG, endemic in the Philippine Islands, planted at the foot of the College Hill, Mayaguez, forms an unbranched shrub or small tree, up to about 6 m. high, with subsessile, oblanceolate, remotely serrate, subcordate, glabrous leaves, 6–8 dm. long; its fruit is ovoid, 3–4 mm. long.

Ficus Bussei Warburg, native of Zanzibar, recorded by the Forest Service as introduced at the Forest Station in 1927 and thrifty, is a tree up to 15 m. in height, with ovate-oblong, cordate leaves, the subglobose figs 3 cm. in diameter. It was also introduced at the St Croix Experiment Station in 1925.

Ficus nota (Blanco) Merrill, native of the Philippine Islands, received by the Agricultural Experiment Station, Mayaguez, from the Bureau of Plant Industry in 1926, grew luxuriantly and had reached a height of over 5 m. in 1929, and fruiting. Trees were also seen at the Trujillo Plant Propagation Station in 1930. Its leaves are oblong to elliptic or obovate, pubescent, 1.5–3.5 dm. long, inequilateral at base and slightly dentate; the edible fruits are borne in large clusters on the trunk of the tree, yellowish, 2.5–3.5 cm. in diameter.

Vol. V, p. 241, add **Artocarpus hypargyreae** Hance, Chinese, introduced by the Forest Service and recorded as thrifty in 1929, has oblong, acuminate leaves, about 10 cm. long, the peduncles of the flowers tomentose.

Artocarpus communis, add note, a tree fully 15 m. high, with a short, massive trunk about 1.5 m. in diameter, was observed in the garden of Los Nisperos, near Tallaboa, Porto Rico, in March, 1930, raised under irrigation.

Vol. V, p. 242, **Cecropia peltata**, add, Porto Rico name LLAGRUMO HEMBRA or YAGRUMO HEMBRA.

Morus nigra, extensive experimentation with this and with other species and varieties of Mulberries as food for silkworms, was carried on by Mr. Franceso Seiu, at the Insular Experiment Station, Rio Piedras, 1926–1930, many kinds being grown, as also by Don Andrés Oliver at Arecibo.

Morus Kagayamae Koidzumi, a Japanese Mulberry, bearing black fruit, was received by the Forest Service from the Bureau of Plant Industry in 1926.

Add **Antiaris innoxia** Blume, an East Indian, milky tree, was about 5 dm. high at the Forest Station, in 1930, grown from seed of 1929.

Vol. V, p. 242; Vol. VI, p. 343, add records of species of **Castilla** planted at the Mayaguez Experiment Station, communicated by Mr. T. B. McClelland; these trees were received from the Bureau of Plant Industry and grew luxuriantly.

Castilla elastica, introduced in 1903, had reached, in 1929, height of about 22 m. with trunk diameter of over 5 dm.

Castilla nicoyensis O. F. Cook of the Nicoya Peninsula, Costa Rica, introduced in 1903, has reached in 1929, height of about 18 m. with trunk diameter of about 4.5 dm.

Castilla costaricana Liebmann, of eastern Costa Rica, introduced in 1903, had attained in 1929, dimensions about the same as **C. nicoyensis**. Its Costa Rica name is PALO DE ULE.

Castilla lactiflua O. F. Cook, a Mexican tree, introduced in 1912, has reached in 1929 a height of about 16 m. with trunk diameter of 4 to 4.5 dm.

Castilla panamensis O. F. Cook, native of Panama, introduced in 1912, had attained, in 1929, dimensions about the same as **C. lactiflua**. The species are characterized by various features of their inflorescence, flowers and fruits.

Vol. V, p. 251, **Boehmeria nivea**, add note, Mr. Dewey reports that RAMIE, introduced at the Mayaguez Experiment Station in 1904 has been persistent there and vigorous in 1930, but no attempt has been made to produce the fibre.

Vol. V, p. 252, **Pellionia Daveauana**, the prior name is **Polychroa repens** Lour., as pointed out by Dr. Merrill. Mr. Fairchild reports this as very successful in hanging baskets on St. Thomas.

Vol. V, p. 252, **Macadamia ternifolia**, add, grown also at the Experiment Station, Mayaguez, introduced in 1914 and in 1919, where healthy trees about 4 m. high were seen in 1929. The trees at the Forest Station remained thrifty for several years. The tree has not yet borne fruit in Porto Rico.

Vol. V, p. 252, after **Macadamia ternifolia**, add, **Guevina avellana** Molina, EVERGREEN HAZEL, Chilian, experimentally grown by the Forest Service in 1928 and recorded as thrifty, is described as one of the most beautiful of all trees, with snow-white flowers in spikes, pinnate leaves with dentate leaflets, the ovoid-globose fruit indehiscent.

Vol. V, 254, **Santalum album**, a fine tree, 6 m. high, was seen near La Muda in 1930; seedlings 1 dm. high were reported at the Forest Station in 1930, from seed of 1929.

Vol. V, p. 263, **Aristolochia grandiflora**, add note, grown by Mr. Fairchild at Louisenhöj, St. Thomas in 1929, is a long, glabrous, climbing vine, with ovate-orbicular, cordate, acute or acuminate leaves 1.5 dm. wide, and axillary, long-peduncled flowers, the peduncle bearing a small, suborbicular bract near the middle, the perianth with a swollen base, 6-9 cm. long, and a widely spreading purple-blotched and veined limb, 10 cm. long or longer.

Vol. V, p. 266, **Antigonon leptopus**, add synonym *Corculum leptopus* Stuntz, Bull. U. S. Dept. Agric. Bureau Pl. Ind. 282: 86. 1913.

Vol. V, p. 270, **Muehlenbeckia platyclada**, a better name for the CENTIPEDE PLANT is **Homalocladium platycladum** (Muell.) Bailey, this species proving to be distinct from *Muehlenbeckia* and its classification thus improved.

Add, **Triplaris americana** L., received by the Forest Station, Rio Piedras, from the U. S. Bureau of Plant Industry in 1928, and established, is similar to *T. caracasana* in foliage, differing in character of the fruiting calyx-segments. It is a native of Central America. The plants were about 7 dm. high in 1930. This species was grown from seed of 1929, at the St. Croix Experiment Station and recorded by Mr. Thompson as about 1 m. high in April, 1930.

Vol. V, p. 282; Vol. VI, p. 344. **Gomphrena dispersa**, add record, waste roadside, near Salinas, January 7, 1929.

Vol. V, p. 289, **Neea buxifolia**, add abundant at Cape Borinquen, 1928.

Vol. V, p. 289, after **Bougainvillea glabra**, add note, a bud-sport branch on a plant of the red-flowered **Bougainvillea** in the garden of Mr. and Mrs. W. V. Tower, near Guanabo, Porto Rico, first observed by Mr. Tower in 1927, and propagated by him from cuttings, bears elegant terminal clusters of salmon-pink flowers, the foliage identical with that of the plant from which it sprang.

Vol. V, p. 293, add, **Phytolacca americana** L., POKE-WEED, reported by Mr. O. W. Barrett as introduced at the Trujillo Plant Propagation Station about 1927, native of temperate North America, did not prove to be persistent in the climate of Porto Rico at low elevation.

Vol. V, p. 294, **Mollugo verticillata**, add note, the narrow-leaved plant of white sand areas appears like a distinct species, for which the name **M. Berteriana** Ser. seems applicable. Plants observed at Laguna Tortuguero in March 1930, indicate that this species is, at least sometimes, perennial.

Vol. V, p. 297, **Alsine antillana**, add note, descends to about 200 m. on steep bank between Ciales and Morovis.

Vol. V, p. 300, **Portulaca poliosperma**, add in description: petals 12 mm. long.

Vol. V, p. 305, **Castalia zanzibarensis**, add note, this species, sent in 1912, to Mr. Harold I. Sewall at Nguabo, and established there in a concrete tank, proved luxuriantly persistent, and was seen there flowering elegantly in February 1929.

In the Autumn of 1928, ten different **Castalias** were sent to the Agricultural Experiment Station, Mayaguez, from the New York Botanical Garden, where they developed rapidly and bloomed luxuriantly in the Spring of 1929, and were distributed.

Vol. V, p. 313; Vol. VI, p. 345, **Annona diversifolia**, add note, trees at the Insular Experimentation Station had reached a height of about 5 m. in February, 1929, bearing fruit at that time; the fruit is subglobose, about 1 dm. in diameter, composed of numerous, rounded, projecting carpels. It was also introduced at the St. Croix Experiment Station in 1928.

Annona cherimolia, add record, introduced at the St. Croix Station from seed in 1929, and as plants in 1930.

Vol. V, p. 314, add at end of ANNONACEAE, **Monodora Myristica** Dunal, CALABASH NUTMEG, of tropical Africa, introduced at the Forest Station, Rio Piedras, prior to 1928, and recorded as thrifty, is a small tree, with large, solitary flowers, the three outer petals crisped, yellow, the three inner ones cordate, erect, whitish and mottled; the globular smooth fruit 7-8 cm. in diameter, many-seeded, the aromatic seeds with flavor and odor of nutmegs.

Uvaria rufa Blume, of the Philippine Islands and East Indies, grown at the Experiment Station, Mayaguez, in 1930, is a scandent shrub, often 6 m. in length, the younger parts pubescent with stellate hairs, the oblong-ovate or oblong-lanceolate leaves 5-14 cm. long, acuminate at the apex, cordate or rounded at the base, the short petioles only 3-7 mm. long, the flowers extra-axillary, solitary, or 2 or 3 in depauperate cymes, the fleshy fruit about 1.5-2 cm. in diameter when mature.

Vol. V, p. 319, **Phoebe elongata**, add Porto Rico name LAUREL BOBO, communicated by Mr. C. L. Bates.

Vol. V, p. 321, **Ocotea portoricensis**, add Porto Rico name LAUREL GEO, also communicated by Mr. Bates.

Vol. V, p. 327, add after **Lepidium**

1 a. **CARARA** Medic. Plfig. 1: 34. 1792.

Diffuse, malodorous herbs, with pinnatifid leaves, and small whitish flowers. Silicles small, didymous, sessile, laterally compressed. Stamens often 2, or 4. Valves of the fruit obtuse at each end, indehiscent, roughened, falling away from the septum at maturity. Seeds 1 or 2 in each cavity, the cotyledons incumbent. (Ancient Italian name). About 6 species, widely distributed. Type species: *Carara Coronopus* (L.) Medic.

1. **Carara didyma** (L.) Britton; Britton & Brown, Ill. Fl. ed. 2, 2: 167. 1913.

Lepidium didymum L. Mant. 92. 1767.

Senebiera didyma Pers. Syn. 2: 185. 1806.

Tufted, spreading on the ground, sparingly pubescent, the stems prostrate, branching. Leaves deeply 1-2-pinnatifid, the lower slender-petioled, the upper sessile; flowers minute, racemose; pedicels 2-3 mm. long in fruit; silicle about 2 mm. broad and 1 mm. high, its valves obtuse, readily separating into 2, ovoid, rugose nutlets.

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Myrtales to Lycopodiales.

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- Part 3, pp. 317-521. June 15, 1926.
- Part 4, pp. 523-663. December 19, 1930.

Roadside, Hacienda Limon, above Villalba, Porto Rico, January, 1930, (*Britton 9437*).—Jamaica; Bermuda; Bahamas; Cuba; Antigua; Martinique. Widely distributed as a weed in temperate and tropical regions. Native of the Old World.

Vol. V, p. 330, **Armoracia** *Armoracia*, add note, the plant proved to be unadapted to the climate and succumbed. It might, perhaps, be established at high elevations.

Vol. V, p. 335, under **Capparis flexuosa**, add note, the fragrant flowers open in the late afternoon and fall apart in the late morning of the next day, (observed at Coamo Springs, March 18, 1927).

Vol. V, p. 339, add, **Liquidambar formosana** Hance, Chinese, grown from seed at the Forest Station, Rio Piedras, in March, 1928, was luxuriant and 1.3 m. high in January, 1930. It forms a tree up to 40 m. high, similar to the North American Sweet Gum, differing in the 3-lobed leaves with long-acuminate lobes.

Vol. V, p. 339, add, after **Liquidambar Styraiciflua**, **Platanus orientalis**, experimentally planted at the Forest Station, Rio Piedras, 1926, failed to establish itself, being unsuited to tropical climates.

Add at end of CRASSULACEAE, several species of **Crassula**, introduced by Mr. F. M. Pennock at Sabana Llana, Porto Rico, in 1929, had not flowered up to April, 1930.

Several species of **Echeveria**, experimentally grown by Mr. Fairchild at Louisenhøj, St. Thomas, proved unadapted to the climate, after several years observation.

Vol. V, p. 340, add, the following species of the genus **Pittosporum**, Family PITTOSPORACEAE, were experimentally introduced by the Forest Service in 1925–1927, were thrifty for a time, but were found to be unadapted to the climate, at least at the lower elevations.

Pittosporum crassifolium Soland.	New Zealand
Pittosporum phylliraeoides DC.	Australian
Pittosporum rhombifolium A. Cunn.	Australian
Pittosporum Tobira Dryand.	Japanese
Pittosporum undulatum Vent.	Australian

Vol. V, p. 341, **Rubus rosaefolius**, add, illustrated in *Addisonia*, plate 446.

Vol. V, p. 342; Vol. VI, p. 347, 348, add, none of the species of **Rubus** grown at the Insular Experiment Station survived, except **Rubus probus**, which was luxuriant there in February, 1929.

Vol. V, p. 343, after **Fragaria chiloensis**, add note, cultivation of strawberries was demonstrated as successful in Porto Rico, by Don Andres Oliver of Arecibo, 1926–1930, being grown in large quantities. A luxuriant plot was seen in the garden of Mr. McKay-Jones, above Villalba in January and another in Mr. Ellsworth's garden at Cidra in April, 1930.

Vol. V, p. 348, **Pithecellobium arboreum**, read **Cojoba arborea** (L.) Britton & Rose, N. Am. Flora 23: 29. 1928. The genus *Cojoba* is distinguished from *Pithecellobium* by seeds without a fleshy aril and the branches unarmed.

Inga fastuosa, add, grown also in large quantity for coffee-shade at the Forest Station, Rio Piedras, 1929–30. Also established at the Mayaguez Station.

Inga edulis, add, grown also at the Forest Station, Rio Piedras. Well established at the Mayaguez Station in 1929.

Vol. V, p. 349, for **Pithecellobium platylobum**, read **Havardia platyloba** (Spreng.) Britton & Rose, N. Am. Flora 23: 43. 1928.

Vol. V, p. 349, for **Pithecellobium parvifolium**, read **Chloroleucon**

mangense (Jacq.) Britton & Rose, N. Am. Flora 23: 38. 1928. The plant of Jamaica proves to be the same as one of continental tropical America.

Vol. V, p. 350, read 1. **Anneslia portoricensis** (Jacq.) Donn. Smith, Enum. Pl. Guat. 2: 18. 1891.

Vol. V, p. 351, **Albizzia stipulata**, the tree at Mayaguez attained large size, but was destroyed by the hurricane of September 1928, only a few basal shoots remaining in March, 1929.

Add, **Albizzia Julibrissin** Durazz., SILK-TREE, seen as recently germinated seedlings under this name at the Forest Station, Rio Piedras, in January, 1930, is an Asiatic tree, which has been naturalized in the southeastern United States. It becomes about 10 m. high, the large bipinnate leaves with many, oblong, acute leaflets 10–16 mm. long, the panicle heads of pink flowers about 5 cm. in diameter, the stamens about 2 cm. long; the papery legume is 10–15 cm. long, narrowed at both ends.

Vol. V, p. 351; Vol. VI, p. 348, **Albizzia procera**, trees 7–8 m. high, were seen in fruit at the Forest Station, Rio Piedras, Porto Rico, in January, 1930.

Vol. V, p. 352–355. Subsequent studies of the genus **Acacia** improved the classification by restricting the name to the typical species, **Acacia nilotica** and its relatives, native of Africa. The following changes in nomenclature were proposed in North American Flora 23: 85–120. 1928.

Vol. V, p. 352, for **Acacia muricata** read **Senegalia muricata** (L.) Britton & Rose, N. Am. Flora 23: 113. 1928. The genus **SENEGALIA** differs from **Acacia** by having flattened, continuous-margined legumes which are not pruinose.

For **Acacia Suma**, read **Senegalia Suma** (Roxb.) Britton & Rose, loc. cit.

Vol. V, p. 353, for **Acacia riparia** read **Senegalia Westiana** (DC.) Britton & Rose, loc. cit. 119. 1928. *Acacia riparia* is a tree of Peru, apparently quite different from the West Indian plants which have been regarded as the same by several authors.

For **Acacia anegadensis** read **Fishlockia anegadensis** (Britton) Britton & Rose, loc. cit. 91. 1928.

For **Acacia macracantha** read **Poponax macracanthoides** (Bert.) Britton & Rose, loc. cit. 89. 1928. *Acacia macracantha* is a tree of Ecuador; West Indian plants have erroneously been regarded as identical with it. The genus **POPONAX** differs from **Acacia** by its swollen, non-pruinose legumes, and other characteristics.

Vol. V, p. 354, for **Acacia tortuosa** read **Poponax tortuosa** (L.) Britton & Rose loc. cit. 89. 1928.

Vol. V, p. 354, for **Acacia Senegal** read **Senegalia Senegal** (L.) Britton. (*Mimosa Senegal* L.)

Add at end of **Acacia**, **Acacia cyanophylla** Lindl., Australian, grown by the Forest Service at Rio Piedras and reported as thrifty and established in May, 1929, is an ornamental shrub with narrowly oblong phyllodes 1–3 dm. long, the few heads of flowers in short racemes. It was also grown from seed at the St. Croix Experiment Station in 1929.

Acacia floribunda Willd., of Australia and Tasmania, also grown by the Forest Service, is a small tree, which had reached height of nearly 10 m. in May, 1929. It has linear-oblong phyllodes 7–12 cm. long, the flowers in axillary spikes.

Acacia saligna Wendl.; also Australian, reported by Mr. Thompson as grown from seed at the St. Croix Experiment Station in 1929, has falcate-lanceolate phyllodes, its heads of flowers short-racemose. This species and the two

preceding ones differ widely from typical *Acacias* by their phyllodal leaves and flat or compressed legumes and may be included in the genus **Drepaphyla** Raf. Seeds of the related species recently germinated at the Forest Station.

Vol. V, p. 356, add, 1 a. **Acuan insulare** Britton & Rose, N. Am. Flora **23**: 133. 1928.

Suffruticose, glabrous, erect or depressed, 1.3 m. high or less. Stipules filiform; leaves 2–6 cm. long; petioles 5–10 mm. long; pinnae 2–6 pairs with an orbicular gland 0.5–1 mm. broad, between the lower pair; leaflets 10–16 pairs, linear, 3–5 mm. wide; peduncles 3–5 cm. long, heads several-flowered; stamens 10; legume linear, 5–7 cm. long, 2–3.5 mm. wide.

Limestone hills near Ponce; Desecheo; Culebra. Bermuda; Jamaica; Hispaniola; Cuba. Formerly included in *A. virgatum*, differing in the small orbicular leaf-gland.

Vol. V, p. 356, for **MORONGIA** substitute the prior generic name **LEPTO-GLOTTIS** DC. Mem. Leg. 451. 1825.

Vol. V, p. 357, for **Morongia portoricensis** read **Leptoglottis portoricensis** (Urban) Britton & Rose, N. Am. Flora **23**: 140. 1928.

Mimosa Ceratonia constitutes the genus **LOMOPLIS** Raf. Sylva Tell. 118. 1838. This differs from **MIMOSA** by its unsegmented broad legumes, and its mostly 3-parted flowers. The name becomes **Lomoplis Ceratonia** (L.) Raf. loc. cit.

Vol. V, p. 359, add **Adenanthera microsperma** Teijsm. & Binn., native of Java, was introduced by the Forest Service in 1926 and was recorded as thrifty; it is a valuable timber tree, with rich-brown wood and coiled legumes; the seedlings were received from the Chapman Field Station, Florida, of the Bureau of Plant Industry.

Vol. V, p. 359, for **PROSOPIS** substitute **NELTUMA** Raf. Sylva Tell. 119. 1838. The American plants hitherto referred to the genus **Prosopis** are distinct from the typical species of Africa.

For **Prosopis juliflora** read **Neltuma juliflora** (Sw.) Raf. loc. cit.

Add, **Neltuma glandulosa** (Torrey) Britton & Rose (*Prosopis glandulosa* Torrey), **TEXAN MESQUITE**, grown by President J. W. Harris at the Polytechnic Institute, San German, Porto Rico, from Texan seeds, reached a height of 5 meters when four years old in 1927, and flowered and fruited freely. Its leaves have linear leaflets 2 to 4 cm. long and the slender pod is slightly constricted between the seeds.

Vol. V, p. 360, for the genus **Piptadenia**, substitute 15. **NIOPA** (Benth. & Hook.) Britton & Rose, Addisonia **12**: 37. 1927. **Niopa** has capitate flowers and coriaceous legumes.

For **Piptadenia peregrina**, substitute **Niopa peregrina** (L.) Britton & Rose, Addisonia **12**: 37, plate 403.

Add **Piptadenia africana** Hook. f., a tree of tropical Africa, introduced by the Forest Service prior to 1928, and recorded as thrifty, has flowers in long, slender spikes, the numerous small leaflets falcate.

For **Entada polyphylla**, read **Entadopsis polyphylla** (Benth.) Britton, N. Am. Flora **23**: 191. 1928. This species is distinct generically, from the typical species of **Entada**, which have much larger, woody legumes and axillary spikes of flowers. It is rare in Porto Rico, and not recently collected.

Vol. V, p. 361, add at end of MIMOSACEAE, **Tetrapleura tetraptera** (Schum. & Thonn.) Taubert, experimentally introduced by the Forest Service, but not established, is an interesting tree of western tropical Africa, with bipinnate

leaves, spicate flowers, and 4-winged legumes (*Adenanthera tetraptera* Schum. & Thonn.)

Vol. V, p. 362, **Bauhinia Pauletia**, add note, as observed in flower at Boqueron, December, 1929, the petals are filiform-linear, white, drooping, and the filaments are green.

Bauhinia tomentosa, read **Alvesia tomentosa** (L.) Welw. Apont. 587. 1858. The genus **ALVESIA** Welw., differs from *Bauhinia* in the calyx-tube, which is campanulate, that of *Bauhinia* being cylindric and elongated.

Vol. V, p. 363, add **Phanera punctata** (Bolle) Britton, *Bauhinia Galpinii* N. E. Brown, native of the Transvaal, grown by the Forest Service prior to 1928, and recorded as thrifty, is a subscandant shrub, with orbicular, slightly 2-lobed leaves, 4–6 cm. wide, and scarlet, racemose flowers, their petals 3–4 cm. long, the stamens 3; its legume is 7–10 cm. long, 2 cm. wide. (*Bauhinia punctata* Bolle.)

Bauhinia megalandra Griseb., of the Lesser Antilles, from St. Kitts to Trinidad, and in Venezuela, seen at the Trujillo Plant Propagation Station in 1930, as thrifty trees 5 m. high, has ovate, 9-nerved leaves, 7–15 cm. long, their short lobes rounded, the subracemose flowers with a brown-tomentose calyx-tube, 3–4 cm. long, its spathaceous limb twice as long, the petals white, the 10 stamens elongated; its legume becomes 1.5–2 dm. long.

Bauhinia monandra, read **Caspareopsis monandra** (Kurz) Britton and Rose, N. Am. Flora 23: 217. 1930. **CASPAREOPSIS** Britton and Rose differs from *Bauhinia* in having only one fertile stamen.

Bauhinia variegata, read **Phanera variegata** (L.) Benth. The genus PHANERA differs from *Bauhinia* in having only 3 perfect stamens.

Bauhinia racemosa Vahl, substitute for this name **Phanera VahlII** (W. & A.) Benth.

Vol. V, p. 364; Vol. VI, p. 350, **Stahlia monosperma**, add record, arroyo near Coamo Reservoir, a single tree, detected by Chief Forester W. P. Kramer, in February, 1929; this station is farther inland than previously known to us. This species was illustrated in Addisonia, plate 401. COBANO NEGRA.

Add, **Cynometra cauliflora** L., East Indian, grown from Ceylon seed at the Forest Service Station, Rio Piedras in 1927, was 1.5 dm. high in April, 1928, having promptly germinated. It forms a medium-sized tree, its leaves very short-petioled with one pair or rarely 2 pairs of coriaceous obovate leaflets, 7–15 cm. long, its flowers borne in dense sessile racemes on the branches, the turgid, wrinkled legumes 2.5–3.5 cm. long.

Vol. V, p. 366, **Chamaecrista diphylla**, add, Porto Rico English name, WILD PEANUT; and to description, sometimes bushy, branched, and 1 m. high, as in white sand at Sabana Abajo.

Chamaecrista Swartzii, add, illustrated in Addisonia, plate 444.

Chamaecrista mirabilis, add, illustrated in Addisonia, plate 335.

Vol. V, p. 367, **Chamaecrista portoricensis**, add note, observed as an erect shrub 1 m. high, with erect branches, in *Thrinax* thicket on limestone hill, between Ponce and Tallaboa, February, 1929.

Vol. V, p. 367; Vol. VI, p. 350, **Chamaecrista grammica**, add, to distribution, limestone hill east of Guayanilla.

Vol. V, p. 368, add 9. **Chamaecrista patellaria** (DC.) Greene, Pittonia 4: 32. 1899.

Cassia patellaria DC.; Collad. Hist. Cass. 125. 1816.

Herbaceous, perennial, somewhat woody below; stem simple or little branched, densely pubescent or hirsute, 3-9 dm. high. Stipules lanceolate, acuminate, ciliate, 8-12 mm. long; petiolar gland orbicular, sessile, about 1 mm. broad; rachis hirsute or villous; leaflets 10-25 pairs, linear or linear-oblong, pubescent on both sides or glabrate above, aristulate, 8-15 mm. long, 1.5-3 mm. wide; pedicels 1-4 together, about 8 mm. long or shorter; bractlets lanceolate; sepals lanceolate, hirsute, 5-6 mm. long; petals unequal, about as long as the sepals; legume linear, 2.5-3.5 cm. long, about 4 mm. wide, villous, 6-10-seeded.

Banks and hillsides in moist or wet districts, Porto Rico; Jamaica; Cuba; Tobago; Trinidad; continental tropical America. Similar to *C. aeschynomene*, but densely pubescent.

Vol. V, p. 368, add 10. **Chamaecrista exunguis** (Urban) Britton,

Cassia exunguis Urban, Repert, Sp. Nov. 15: 312. 1918.

A low shrub, 2-4 dm. high, the twigs puberulent. Stipules lanceolate or ovate-lanceolate, acuminate, 3-4 mm. long; petiolar gland suborbicular, subsessile, 0.2-0.4 mm. broad; petiole 2-3 mm. long; rachis 1-1.5 cm. long; leaflets 6-8 pairs, linear to oblong, 4-7 mm. long, 1-1.5 mm. wide, setaceous-mucronate, glabrous or sparingly pilose, the midvein excentric; flowers 1 or 2 on pedicels 6-9 mm. long; sepals 4.5-5.5 mm. long, short-acuminate; petals very unequal, not clawed, the larger ones 5-6 mm. wide; larger anthers 5 mm. long; ovary appressed-pilose; legume 2-2.5 cm. long, about 4 mm. wide, short-pilose or becoming glabrous.

Steep bank, between Aibonito and Coamo, Porto Rico. Endemic.

Vol. V, p. 369, **Cassia nodosa**, add, a tree in the collection of the Mayaguez Experiment Station was about 10 m. high, with trunk diameter of 1.5 dm., luxuriant and fruiting in March, 1929. The trunk is armed with stout spines 1 dm. long, the terete, pendulous legumes about 5 dm. long.

Vol. V, p. 369, add **Cassia artemisioides** Gaudich., Australian, reported by Mr. Thompson as introduced at the St. Croix Experiment Station from Californian seeds, in 1929, is a silky shrub, its leaves with 3 to 6 pairs of nearly terete leaflets 2-3 cm. long, the small flowers racemose, the linear, flat legume 4-7 cm. long, the perfect stamens 10. It is a species of an Australian group generically distinct from *Cassia*.

For **Cassia siamea** read **Sciacassia siamea** (Lam.) Britton. The genus SCIACASSIA has flat, dehiscent legumes.

Add **Pseudocassia spectabilis** (DC) Britton & Rose, of tropical America, is recorded by the Forest Service as grown from seed in 1900 [*Cassia spectabilis* DC].

Chamaefistula antillana, add, illustrated in Addisonia, plate 405; add to distribution, Hispaniola.

Vol. V, p. 372, **Ditremexa Sophera**, add locality, in a field, Descalabrados Segunda, Porto Rico, March, 1930.

Vol. V, p. 373, **Peiranisia polyphylla**, add, illustrated in Addisonia, plate 2.

Vol. V, p. 377, **Poinciana Gilliesii**, add note, grown also from seed at the St. Croix Experiment Station in 1929, and reported as 3 dm. high in April, 1930. As a genus distinct from *Poinciana* this is **Erythrostemon Gilliesii** (Hook.) Link, Otto & Klotzsch.

Vol. V, p. 378; Vol. VI, p. 350, **Libidibia coriaria**, add to distribution, plain near Boqueron, Porto Rico, a solitary tree about 4 m. high, observed in February, 1929. A luxuriant tree, planted long ago at Villa Leon, near Bayamon, was seen in December, 1929.

Vol. V, p. 379, **Guilandina Crista**, add note, a vine at Playa de Tiburon, east of Ponce, Porto Rico, studied February 18, 1928, had all the characters of this species, except that the apparently mature seeds were green instead of gray.

Vol. V, p. 380, add, 6. **Guilandina culebrae** Britton & Wilson; Britton & Rose, N. Am. Flora, **23**: 339. 1930.

Unarmed throughout, the branches, leaf-rachis and inflorescence finely pubescent. Stipules minute or wanting; pinnae 7 pairs, approximate; leaflets 6 or 7 pairs, elliptic or the upper pair elliptic-obovate, subchartaceous, light green, glabrous, or minutely puberulent on the midvein beneath, inequilateral, the apex rounded or slightly emarginate, cuspidate, the base obliquely obtuse; racemes long-peduncled, many-flowered, 6-9 cm. long; pedicels 3-5 mm. long, tomentulose; calyx tomentulose, 8 mm. long; petals about as long as the calyx-segments; legume obliquely oval, puberulent, unarmed, 7 cm. long, 4 cm. broad, the nearly horizontal more or less curved beak, 1-2 cm. long; seeds orange-yellow, globose.

Coast of Culebra Island, Porto Rico, March 3-12, 1908, *Britton & Wheeler*, 79.

Vol. V, p. 380, **Schizolobium excelsum**, add record, introduced also into Porto Rico by the Forest Service, but did not thrive; the older specific name of this tree is **S. Parahyba** (Vell.) Blake.

Vol. V, p. 381; Vol. VI, p. 351, **Peltophorum ferrugineum**, add record, a tree at the Mayaguez Experiment Station was about 16 m. high and luxuriant in March, 1929. The older name is **Peltophorum inerme** (Roxb.) Naves.

Add at end of CAESALPINIACEAE, **Colvillea ramosa** Bojer, native of Madagascar, seen as a young tree 3 m. high in the arboretum of the Mayaguez Experiment Station, in March, 1929, has large bipinnate pubescent leaves, with many, small, oblong, obtuse leaflets; its flowers are described as red and showy.

Copaiva coleosperma (Benth.) Britton, recorded by the Forest Service as introduced, and thrifty prior to 1928, is native of tropical Africa, forming a large tree; its leaves have two ovate, 1-nerved, leaflets; its legumes are wrinkled, 2-3 cm. long (*Copaifera coleosperma* Benth.).

Dialium laurinum Baker, native of Malacca, introduced at the Plant Propagation Station in 1927, and recorded as thrifty in March, 1930, forms an unarmed tree, its pinnate leaves of about 7, coriaceous, glabrous, oblong leaflets about 10 cm. long, its apetalous, small flowers paniced, with only 2 stamens; the fruit is an indehiscent oblong legume.

Baikiaea insignis Benth., native of tropical Africa, originally described from the island Fernando Po, experimentally introduced by the Forest Service and recorded as thrifty, forms a tree 10-15 m. high, its pinnate leaves with few elliptic coriaceous leaflets, its racemose flowers very large, the petals 10-15 cm. long.

Baikiaea Eminii Taubert, of eastern tropical Africa, also introduced by the Forest Service and recorded as thrifty, resembles the foregoing.

Ceratonia siliqua L., CAROB-TREE, native of the Levant, reported as grown from seed at the St. Croix Experiment Station in 1928, and about 1.5 m. high in April, 1930, is a widely spreading pinnate-leaved tree, with small apetalous flowers in spikes, the linear legumes fleshy.

Trachylobium Hornemannianum Heyne, a tree of tropical Africa, seeds of which germinated at the St. Croix Experiment Station in 1930, has 2-foliate leaves, white, paniced flowers, the coriaceous legume indehiscent.

Mora excelsa Benth. (*Diphormandra Mora* Benth. & Hook.), of Trinidad and British Guiana and **Saraca indica** L., East Indian, were grown from seed at the Forest Station in 1930.

Vol. V, p. 385; Vol. VI, p. 351, **Ormosia dasycarpa**, add note, the seedlings observed at the Forest Station, Rio Piedras, in 1925, failed to develop.

Vol. V, p. 386; Vol. VI, p. 351, **Crotalaria striata**, add to distribution, along roadsides, Pueblo Viejo and Rio Piedras, 1928. Frequently planted in Porto Rico as a cover-crop.

Vol. V, p. 387, **Crotalaria retusa**, add, illustrated in Addisonia, plate 248.

Vol. V, p. 388, add, **Crotalaria madurensis** Wight., native of India, grown from seed at the Agricultural Experiment Station, Mayaguez in 1926, failed to produce fruit; it is a stout plant, about 1.5 m. high, with 1-foliolate, broadly oval, silky-pubescent leaves, 4-5 cm. long, their petioles very short.

Crotalaria usaramoensis E. Baker, native of the East Indies, introduced by seed at the Mayaguez Experiment Station in 1921, experimentally grown and frequently distributed as a valuable cover-crop, attains a height of over 2 m.; it has 3-foliolate, petioled oblong leaves and rather small, yellow flowers in long, dense, terminal racemes, the oblong legume about 3 cm. long.

Vol. V, p. 390, add, **Indigofera Dosua** Hamilton, a shrub of the Himalayas, introduced by the Forest Service prior to 1928, and recorded as thrifty, has subsessile leaves with 21-31 linear-oblong leaflets, 6-12 mm. long, the bright red, racemose flowers about 12 mm. long. (*I. tomentosa* Graham).

Vol. V, p. 391; Vol. VI, p. 351, **Cracca candida**, add record, now much planted as a cover-crop in Porto Rico. The photoperiodism of this plant was intensively investigated by Mr. T. B. McClelland, Horticulturist of the Porto Rico Agricultural Station, at Mayaguez, and his important results were published in "Journal of Agricultural Research," 28: 445-460, plates 1-4. Washington 1924.

Vol. V, p. 392, **Barbieria pinnata**, add, illustrated in Addisonia, plate 334.

Vol. V, p. 393, **Sabinea florida**, add note, a small tree with white flowers was observed on a hillside south of Aibonito, March 27, 1927. Illustrated in Addisonia, plate 497.

Sabinea punicea, add, illustrated in Addisonia, plate 395.

Vol. V, p. 394; Vol. VI, p. 351, **Corynella pauciflora**, read, **paucifolia**; add notes, as observed at Rio Canas, near Coamo, in March, 1929, the flowers are crimson, changing to violet and purple; at this locality this shrub is gregarious; illustrated in Addisonia, plate 498.

Vol. V, p. 397, **Aeschynomene americana**, add note, observed growing prostrate among stones on river-flats near Sabana Grande, 1927.

Pictetia aculeata, add note, observed gregarious in a swale near Boqueron in 1929, forming a dense, pure colony.

Vol. V, p. 398, **Aeschynomene portoricensis**, add to distribution, hillside, about 7 km. north of Coamo, detected by Mrs. Horne, January, 1929.

Vol. V, p. 402, for **Meibomia axillaris** substitute the name **Nephromeria axillaris** (Sw.) Schindler, Repert. Sp. Nov. 20: 284. 1924.

For **Meibomia Sintenisii** substitute the name **Nephromeria Sintenisii** (Urban) Britton & Wilson, *Desmodium axillaris Sintenisii* Urban, Symb. Ant. 2: 303. 1900. As pointed out by Schindler these species are better classified in a genus distinct from *Meibomia*.

For **Meibomia umbrosa**, substitute the name **Nephromeria umbrosa** (Britton) Britton & Wilson.

Vol. V, p. 403, **Meibomia Wydleriana**, add note, perhaps also a **Nephromeria** but its fruit is not known to us.

Vol. V, p. 404, add **Meibomia Rensonii** Painter, introduced from El Salvador, Central America, at the Trujillo Plant Propagation Station as a forage plant, was 2 m. high and luxuriant in February 1929; its oblong-elliptic leaflets are finely pubescent; its legume several-jointed, the small suborbicular joints puberulent.

Vol. V, p. 406, **Drepanocarpus lunatus**, add note, observed forming a slender tree, 8 m. high, in the wet forest north of Playa de Humacao, March, 1927.

Vol. V, p. 407, **Pterocarpus officinalis**, add note, abundant and of large size in the marsh forests north of Playa de Humacao, in 1927; the trunks develop flange-like buttresses 1-2 m. high.

Pterocarpus erinaceus Poir., of tropical Africa, seen as a young tree, 2.5 m. high, at the Forest Station, Río Piedras, in March, 1928, grown from seed planted in 1925, is a tree about 15 m. high, with pinnate leaves and yellow flowers in large panicles, the legume 5-7 cm. in diameter.

Pterocarpus Marsupium Roxb., recorded as grown from seed at the Forest Station in 1930, is an East Indian tree, the pinnate leaves with oblong, obtuse leaflets.

Vol. V, p. 408, add **Lonchocarpus formosianus** DC., introduced by the Forest Service prior to 1928 and recorded as thrifty, is an African tree, the leaves with coriaceous, oval, obtuse leaflets, the legumes sericeous.

Vol. V, p. 414, **Cajan Cajan**, add, about forty cultivated varieties of Pigeon Peas were brought together by Mr. Barrett at the Trujillo Plant Propagation Station in 1926 and 1927; most of this collection was still luxuriant there in 1930.

Vol. V, p. 416, **Calopogonium coeruleum**, add record, persistent at Mayaguez, where collected again in 1930.

Vol. V, p. 420, **Phaseolus trichocarpus**, the prior name is **Phaseolus Schottii** Benth. Ann. Wien. Mus. Nat. 2: 139. 1840 (according to Piper, Contr. U. S. Nat. Herb. 22: 678).

Vol. V, p. 421, **Phaseolus lathyroides**, read **Macroptilium lathyroides** (L.) Urban, Symb. Ant. 9: 457, 1928. This species has been segregated from the genus *Phaseolus*, as the type of a distinct genus **MACROPTILIUM** (Benth.) Urban, characterized by the bases of the wings and keel of the corolla being adnate to the stamen-tube, and by the subterete or compressed, narrow legume.

A colony of plants with white flowers was found in sandy soil near Santurce, near other plants with red flowers, by Mrs. C. E. Horne, blooming in February, 1927.

Vol. V, p. 427, **Erythrina Corallodendrum**, Mr. C. Z. Bates reports this tree as attaining a height of 15 m. above Yauco, Porto Rico. Illustrated in Addisonia, plate 404.

Vol. V, p. 428, **Erythrina Poeppigiana**, add, illustrated in Addisonia, plate 331. In citation, for p. 27, read p. 57.

Vol. V, p. 429, add **Dalbergia sericea** G. Don, East Indian, was represented in the collection at Mayaguez Experiment Station in 1930 by a young tree, apparently thrifty. It is a native of India, its pinnate leaves silky, its flowers in small panicles shorter than the leaves.

Vol. V, p. 429; Vol. VI, p. 352, **Dalbergia Sissoo**, add record, a tree at the Forest Station, had reached over 6 m. in height in 1929.

Vol. V, p. 429, **Hedysarum coronarium**, add record, the plant failed to withstand the climate.

Add **Vicia Faba** L. (*Faba vulgaris* Moench.). BROAD BEAN, probably native of the eastern Mediterranean Region, grown experimentally for fodder in

Porto Rico, is an erect, glabrous herb about 1 m. high or lower, with pinnate leaves of 2 to 6 oblong or elliptic leaflets 4-6 cm. long, and without tendrils; the axillary white flowers have a bluish blotch; the large, flat and thick pods are from 0.5-4.5 dm. long.

Robinia Pseudacacia, add note, as expected, this tree did not survive in Porto Rico, being unadapted to the climate.

Add at end of FABACEAE, **Milletia Mannii** Baker, a tree of tropical Africa, experimentally introduced by the Forest Service, failed to thrive. It is a shrub or small tree, with pinnate leaves and rather large paniced flowers.

Bolusanthus speciosus (Bolus) Harms., a pinnate-leaved tree of South Africa, known as RHODESIAN WISTERIA, sent as seedlings to the Forest Station by the Bureau of Plant Industry in 1926, also failed to thrive. It is elegant when in bloom, with large, racemose, bright blue flowers. (*Lonchocarpus speciosus* Bolus).

Psophocarpus tetragonolobus (L.) DC., grown at the Trujillo Plant Propagation Station, 1927-1930 and distributed, is a twining, annual, tuberiferous vine, with large 3-foliate leaves and large bluish flowers; the pods are 4-winged, from 2.5 to 4 cm. long, used as a vegetable when young. The geographical origin of this plant is unknown (*Dolichos tetragonolobus* L.).

Moghania strobilifera (R. Br.) St. Hil., an East Indian shrub, the leaves of a single elliptic leaflet, the flowers in bracted spikes, was introduced by the Forest Service, but failed to establish itself. It is naturalized, however, in Jamaica, and in Trinidad. (*Flemingia strobilifera* R. Br.).

Vol. V, p. 440, add **Banisteria longifolia** Sw., a woody vine with coriaceous leaves 1-2 dm. long, and yellow flowers, was recorded by Niedenzu in 1928 as collected many years ago in Porto Rico by Ventenat; it has not been detected there by recent observers. (*Heteropteris longifolia* (Sw.) Niedenzu).

Vol. V, p. 441, **Stigmaphyllon ledifolium**, add locality, bank above Guayama, (*Britton 9005*) March 11, 1928. Leaves larger than those of Cuban specimens, up to 9 cm. long.

Vol. V, p. 447, **Byrsonima Horneana**, add, illustrated in Addisonia, plate 332.

Vol. V, p. 448, add at end of MALPIGHIACEAE, **Adenoporces buxifolia** (Cav.) Small (*Tetrapteris buxifolia* Cav.) of Hispaniola and Cuba, is recorded by Niedenzu, in Pflanzenreich 4¹⁴¹: 204, as collected in St. Thomas by Holton on May 16, 1854. It is otherwise unknown from the Virgin Islands and has not been reported from Porto Rico. It is a vine resembling *Stigmaphyllon lingulatum*, which is common on St. Thomas, and as shown by a specimen in the Torrey Herbarium, was collected there by Holton on the date mentioned.

Vol. V, p. 452, **Zanthoxylum martinicense**, add, Porto Rico name ESPINO MAPURITO.

Vol. V, p. 455, for **Citrus Limonum** Risso, read **Citrus Limonia** Osbeck, Reise Ostind, China 250. 1765.

Vol. V, p. 457, for **Citrus grandis** Osbeck, read **Citrus maxima** (Burm.) Merril, Inter, Rumph. Herb. Amb. 296. 1917.

Aurantium maximum Burm., Rumph. Herb. Amb. Auct. 1755.

Citrus paradisi Macf.; Hook. Bot. Misc. 1: 304. 1830.

Citrus maxima urocarpa Merrill & Lee, Am. Journ. Bot. 11: 382. f. 1, 1924.

Add **Citrus Webberi** Wester, received from the United States Department of Agriculture in 1926, and planted at La Granja, Porto Rico, by Commissioner Chardon, is from the Philippines. It is a low tree, armed with small spines, the

ovate leaves with winged petioles, the flowers about 2 cm. broad, the ovoid fruit about 6 cm. long, with thin rind and aromatic pulp.

Casimiroa tetrameria, add record, a tree at the Insular Experiment Station, had reached a height of 4.5 m. in February, 1929, seen then in flower.

Clausena lansium, add record, a vigorous young tree about 4 m. high, was seen at the Mayaguez Experiment Station in March, 1929.

Add at end of RUTACEAE, **Merrillia caloxylon** (Ridley) Swingle, native of Malaya, planted in 1926 at La Granja, Porto Rico, received from the United States Department of Agriculture, is a pinnate-leaved tree, the leaves with about 13 oblanceolate leaflets 7-9 cm. long, the flowers solitary or few together in the axils, the subglobose fruit 10 cm. long, many-seeded. (*Murraya caloxylon* Ridley).

Hesperethusa crenulata (Roxb.) M. Roemer, seen in the arboretum of the Mayaguez Experiment Station in 1929 as a fine tree 12 m. high, is spiny, with small pinnate leaves of 5 to 9 elliptic, crenulate leaflets. It is a native of southern India, known there as NAIBEL. Its globose fruit is about 1 cm. in diameter.

Balsamocitrus gabonensis Swingle, received in 1926 from the United States Department of Agriculture and planted at La Granja, Porto Rico, is a small tree or shrub, native of French tropical Africa, with simple lanceolate leaves or some of them trifoliate, and nearly globular fruit with a thick, woody rind.

Eremocitrus glauca (Lindl.) Swingle, introduced at La Granja, Porto Rico in 1926, from the United States Department of Agriculture, is an Australian shrub or small tree, the twigs armed with slender spines, the emarginate leaves 2.5-4 cm. long, the subglobose yellow, edible fruit about 2 cm. long, usually 4-seeded. (*Triphasia glauca* Lindl.).

Vol. V, p. 459, **Simarouba Tulae**, add note, attention was called by Mr. T. B. McClelland, in January 1929, to a plant flowering as a shrub 1.5 m. high, on the hill above the arboretum at the Agricultural Experiment Station, Mayaguez.

Vol. V, p. 461, add at end of SIMARUBACEAE, **Ailanthus altissima** (Mill.) Swingle (*A. glandulosa* Desf.), seen as young seedlings at the Forest Station, Rio Piedras, in January, 1930, is a large Chinese tree, widely naturalized in the Eastern United States. It has deciduous, pinnate leaves with several or many, lanceolate, acuminate leaflets, and very small, green, polygamous or dioecious, malodorous, panicked flowers, its fruit thin, narrow, 1-seeded samaras. (*Toxicodendron altissimum* Mill.)

Vol. V, p. 463, add at end of BURSERACEAE, **Canarium commune** L., (*C. indicum* L.), which was grown from Ceylon seed of 1927 at the Forest Station, Rio Piedras, has formed young trees 1 m. high in February, 1929; it is a large resiniferous tree, native of India, with thin, glabrous, pinnate leaves, small 3-parted flowers in panicles, the fruit drupaceous. Other species of **Canarium** introduced by the Forest Service and recorded as thrifty were:

Canarium album Raeusch., of Cochin China.

Canarium amboinense Hochr., of Amboina.

Canarium Pimela Konig, of China.

Vol. V, p. 463, **Melia Azedarach**, add, illustrated in Addisonia, plate 393.

Vol. V, p. 467, **Swietenia Candollei**, add note, many luxuriant trees were established at the Mayaguez Experiment Station, but were seriously damaged by the hurricane of September, 1928. **Swietenia macrophylla**, also well established, suffered much less injury.

Vol. V, p. 468, add **Cedrela Toona** Roxb., native of the East Indies and Australia, planted at the Agricultural Experiment Station, Mayaguez, is a large evergreen tree up to 20 meters or more in height, the glabrous obliquely ovate

or lanceolate leaflets long-acuminate at the apex, the drooping panicles as long as or exceeding the leaves, the white flowers with a honey-like odor, the blackish-brown capsule ellipsoid.

Vol. V, p. 468, add at end of MELIACEAE, **Khaya anthotheca** C. DC., AFRICAN MAHOGANY, native of tropical Africa, experimentally grown by the Forest Service in 1928, and recorded as thrifty, is a tree 12-20 m. high, with foliage similar to that of the true Mahogany, as also its valuable wood.

Add at end of MELIACEAE, **Lovoa Swynnertonii** E. G. Baker, BROWN MAHOGANY, native of Gazaland, tropical Africa, was received by the Forest Service from the Bureau of Plant Industry a few years ago. In its native habitat it is a large tree, 40-50 m. high, with glabrous pinnate leaves, small and panicle, 4-parted, white flowers, its capsular fruit 4-valved.

Vol. V, p. 469, in generic description of **Phlebotaenia** after description of the petals, add, "or in *P. Cowellii*, petals sometimes 5, the two lateral ones small and attached to the staminal sheath," as observed by Mr. T. B. McClelland in flowers from a tree near Parguera, Porto Rico.

Vol. V, p. 470, **Phlebotaenia Cowellii**, note: the trunk of this tree attains much greater thickness than 2 dm.; the largest known to us, along the Military Road, near Coamo, measured March 23, 1928, was nearly 7 dm. in diameter; it was subsequently destroyed. The species was illustrated in *Addisonia*, plate 280. Seeds from a tree near Parguera were germinated by Mr. McClelland at the Agricultural Experiment Station at Mayaguez in the Spring of 1928. The tree was detected also in the vicinity of Arecibo by Prof. H. T. Cowles, and by us near Vega Baja and Toa Baja, growing on limestone hills, in March, 1930. We were guided by school children to a tree in a deep arroyo northeast of the Jueves River Water Gap, east of Coamo Springs.

Under **Badiera**, the type species is *Badiera diversifolia* DC., not *Polygala diversifolia* L.

Vol. V, p. 476, **Xylophylla Epiphyllanthus**, add, illustrated in *Addisonia*, plate 240.

Vol. V, p. 477, **Phyllanthus Emblica**, add record, seen also at the Trujillo Plant Propagation Station, 1929. In February, 1929, two elegant trees were seen, abundantly fruiting, about 10 m. high, with trunk diameter of about 4.5 dm. at the College of Agriculture and Mechanic Arts, Mayaguez.

Vol. V, p. 483, after **Croton glandulosus**, add, 19. **Croton trinitatis** Millsp. *Field Mus. Bot.* 2: 57. 1900.

Geiseleria chamaedryfolia Klotzsch; Hook. *Lond. Journ. Bot.* 2: 47. 1843.

Croton chamaedryfolius Griseb. *Fl. Brit. W. Ind.* 41. 1859. Not Lam. 1786.

Annual, herbaceous, erect, roughish-pubescent, branched, about 5 dm. high or lower. Leaves ovate to ovate-lanceolate, thin, 2-4 cm. long, crenate-dentate, 3-5-nerved, acute or acuminate, with 2 stipitate glands at the obtuse or subtruncate base, the petioles 2.5 cm. long or shorter; racemes short, few-flowered, the pistillate flowers at the base, the 2-parted styles shorter than the ovary; capsule globose, pubescent, 3-4 mm. in diameter; seeds about 2 mm. long.

Collected by I. F. Holton on St. Thomas, in May, 1854, presumably introduced and apparently not persistent, as it has not been reported since. Trinidad; northern South America. Reported from Haiti.

Vol. V, p. 484, **Curcas hernandifolius**, add note, forms a small tree 3 m. high on the north slope of the Cerro de Pandura.

Vol. V, p. 485, add, **Aleurites cordata** Steud., grown from seed at the Forest Station, Rio Piedras, in March 1928, was luxuriant and 1.5 m. high in

February, 1929. It is a Chinese and Japanese shrub, with ovate-orbicular, cordate leaves, 10–15 cm. long, and white flowers in short panicles, the petals 2–2.5 cm. long.

Aleurites Fordii Hemsl., of Central Asia, CHINA WOOD-OIL TREE, reported as grown from seed at the St. Croix Experiment Station in 1930 and grown at the Porto Rico Forest Station the same year, becomes about 8 m. high, with ovate-cordate leaves, the larger, white flowers paniced.

Vol. V, p. 486, **Ditaxis fasciculata**, add to distribution, border of forest, Bahia Puerco, eastern coast of Porto Rico, February, 1927; Cape San Juan, March, 1929.

Vol. V, p. 493, **Manihot dichotoma**, add note, the cultivation of this plant was not continued at Rio Piedras.

Vol. V, p. 496, **Pedilanthus angustifolius**. Specimens from Yanco and from near Ponce were referred by Dr. Millspaugh (Field Mus. Nat. Hist. 2: 361) to *P. Grisebachii* Millsp. & Britton, a species endemic in Jamaica, as subsequently determined.

Vol. V, p. 497, add, **Pedilanthus retusus** Benth. of Colombia and Venezuela, grown by Mr. Fairchild at Louisenhøj, St. Thomas, and determined for us as such by Professor L. H. Bailey, resembles *P. tithymaloides*, but has the pedicels of both kinds of flowers pubescent. Its leaves are sometimes variegated.

Vol. V, p. 497, **Euphorbia lactea**, add record, grown also in the Virgin Islands.

Vol. V, p. 503, **Chamaesyce thymifolia**, add locality, sandy roadside, Cataño, 1930.

Vol. V, p. 506, **Bischofia trifoliata**, add note, the large tree in the Mayaguez collection was much broken in the hurricane of September, 1928.

Excoecaria cochinchinensis Lour., (*E. bicolor* Hassk.) introduced at the Mayaguez Experiment Station in 1929, was about 6 dm. high in January, 1930; it is a shrub, 1.5–2 m. high, with opposite or ternate, lanceolate, crenate leaves 7–10 cm. long, green above, crimson beneath, the minute, greenish flowers axillary, the capsular fruit about 8 mm. wide; Mr. Thompson records it as also introduced at the St. Croix Station in 1929. It is native of Cochin China.

Vol. V, p. 506, add at end of EUPHORBIACEAE, **Bridelia monoica** (Lour.) Merrill, a Chinese tree, introduced by the Forest Service prior to 1928, was not established. It is a small tree with obovate-elliptic leaves 4–7 cm. long (*Clusia monoica* Lour.; *Bridelia tomentosa* Blume).

Elaeophorbium drupifera (Thonn.) Stapf, native of Upper Guinea, a tree, about 8 m. high, with milky sap, 4-angled, stout, short, spinulose branches, obovate, fleshy leaves 7–9 cm. long, tufted at the ends of the branches, the short-peduncled, globose, solitary, berry-like, yellow fruits about 1 cm. in diameter, was seen at Mayaguez, in the collection of the Experiment Station, where it was introduced many years ago. [*Euphorbia drupifera* Thonn.] For identification of this tree we are indebted to Professor L. H. Bailey.

Vol. V, p. 511; Vol. VI, p. 357, **Schinus terebinthifolius**, add record, grown also from seed at the St. Croix Experiment Station, in 1929, and reported as about 3 dm. high in April, 1930.

Vol. V, p. 511, add **Schinus dependens** Ort., South American, grown from seed at the St. Croix Experiment Station in 1929, was 1.5 m. tall in April, 1930. It is a shrub or small tree with drooping branches, the obovate leaves 1.5–3 cm. long, the small, yellow flowers produced in great numbers, the small, globose drupes black.

Vol. V, p. 511, **Pistacia chinensis**, add note, seedlings of this tree did not establish themselves at Rio Piedras and those at the St. Croix Station did not thrive.

Vol. V, p. 515, **Ilex paraguayensis**, add record, the introduction of this plant at Rio Piedras was unsuccessful; trees at the Agricultural Experiment Station at Mayaguez, however, were healthy and about 3 m. high in 1929.

Add, **Ilex cornuta** Lindl. & Paxton, an evergreen Chinese species, with spinulose-dentate leaves, received at the Agricultural Experiment Station, Mayaguez, in 1926, from the Bureau of Plant Industry, grew slowly, and was about 4 dm. high in March, 1929. Its leaves are coriaceous, about 7 cm. long, its small globose berries about 8 mm. in diameter.

Vol. V, p. 519, add note at end of CELASTRACEAE, an incomplete specimen of a tree about 6 m. high, found by Professor H. T. Cowles in limestone woods, near Arecibo, in October, 1912, has not been determined; it has coriaceous, lustrous, glabrous, elliptic leaves about 8 cm. long, bluntly short-acuminate; a single immature fruit, borne on a slender twig, suggests the family Celestraceae.

Vol. V, p. 520, **Hippocratea caribaea**, add note, the plant was observed on the Cerro de Pandura, in flower, February 4, 1927; the fruit is still unknown.

Vol. V, p. 530, **Exothea paniculata**, add note, the flowers are fragrant.

Add at end of SAPINDACEAE, **Nephelium lappaceum** L., RAMBUTAN, East Indian, introduced at the Trujillo Plant Propagation Station in 1927, and about 1 m. high in March, 1930, is a small tree, with pinnate, leaves of 10 to 14 oblong leaflets, the ellipsoid, edible and delicious, crimson, softly spinulose fruits about 6 cm. long.

Talisia olivaeformis (H. B. K.) Radlk., native of northern South America, introduced in 1927 at the Trujillo Plant Propagation Station, was about 8 dm. high in February 1930. It forms a tree 10–20 m. high, its pinnate leaves with 2 pairs, or sometimes with only 1 pair of elliptic leaflets, its small flowers paniced, its yellow, edible, ovoid fruit 1.5–2 cm. long (*Melicocca olivaeformis* H. B. K.).

Koelreuteria paniculata Laxm., a Chinese tree, with deciduous, pinnate leaves, paniced, yellow flowers, the fruit inflated pods, was raised from seed at the Forest Station in 1930. VARNISH TREE.

Acer Hookeri Miquel, HOOKER'S MAPLE, of the related Family ACERACEAE, introduced at the Forest Station, Rio Piedras in 1927, was about 8 dm. high in 1929. It forms a large tree, the thin, ovate, serrate, acuminate leaves 6–15 cm. long, the small flowers racemose, the wings of the fruit divergent.

Vol. V, p. 534, **Sarcomphalus domingensis**, add locality, Capc San Juan.

Vol. V, p. 535, **Zizyphus mauritiana**, add note, the young trees at Rio Piedras in 1914, succumbed.

Zizyphus Jujuba, trees 4–5 m. high were seen in cultivation at the Trujillo Plant Propagation Station in 1930, luxuriant.

Vol. V, p. 538, add at end of RHAMNACEAE, **Hovenia dulcis** Thunb., Asiatic, RAISIN TREE, grown from seed by the Forest Service in 1925 and recorded as thrifty, is a small unarmed tree, with alternate, thin glabrous ovate leaves 10–15 cm. long, the small flowers in cymes, the small, 3-lobed fruit indehiscent.

Vol. V, p. 544, **Corchorus capsularis**, add note, Mr. Dewey reports that experimentation upon JUTE at the Mayaguez Station has been unsatisfactory, after several seed-trials, 1918–1924.

Vol. V, p. 545, add, **Triumfetta hispida** A. Rich.; Sagra, Hist. Cub. 10: 81. 1845.

Stellate-tomentose. Stems 8 dm. or more tall, branched; leaves ovate or suborbicular in outline, the blade 3–9 cm. long, 2.5–8 cm. wide, sometimes 3-lobed, irregularly toothed, the base rounded, truncate or somewhat cordate, the apex acute to acuminate; panicles narrow; sepals linear-oblong, 7–8 mm. long; petals oblong or oblong-oblong, 6–7 mm. long; fruit, including the prickles, 6–7 mm. in diameter, the body tomentose.

Waste places, St. Croix:—Cuba; Isle of Pines; Hispaniola; Yucatan; Panama; Colombia and Ecuador.

Vol. V, p. 547, **Abutilon abutiloides** (Jacq.) Schum. The prior name for this species is **Abutilon americanum** (L.) Sweet, Hort. Brit. 1: 53. 1826. (*Lavatera americana* L. Syst. ed. 10. 1148. 1759).

Vol. V, p. 551, **Sida erecta** Macf. The prior name for this species is **Sida salviaeifolia** Presl, Rel. Haenk. 2: 110. 1836.

Vol. V, p. 551, add after **Sida spinosa**, 3 a. **Sida alba** L. Sp. Pl. ed. 2, 960. 1763.

Sida spinosa var. β . L. Sp. Pl. 684. 1753.

Sida angustifolia Mill. Gard. Dict. ed. 8, 1768.

Young branches, petioles, peduncles and leaf-blades clothed with minute, stellate hairs. Leaves oblong-linear to lanceolate or oblong-ovate, 1.5–5 cm. long, 0.4–2 cm. wide, acute or obtuse at the apex, rounded or subcordate at the base, 5-nerved, petioles 0.3–1 cm. long; peduncles 8–11 mm. long; calyx 5–6 mm. long, tomentose with minute stellate hairs, 10-nerved, 5-angled, the lobes deltoid; petals white; carpels 5, about 2 mm. long, opening with two short beaks; seed 1.9 mm. long, dark brown.

Roadsides, Virgin Gorda:—Bahamas; Cuba; Montserrat; Texas and continental tropical America; Africa and India.

Vol. V, p. 553, **Sida humilis**, add to habitat, on a vertical rock-cut near Coamo and on rocky limestone hill south of San German.

Vol. V, p. 559, **Urena lobata**, add, illustrated in Addisonia, plate 330.

Vol. V, p. 562, **Hibiscus bifurcatus**, add note, some plants bear unlobed or but slightly lobed leaves, and are nearly unarmed.

Vol. V, p. 563, **Hibiscus cannabinus**, add, grown also in Virgin Island gardens.

Vol. V, p. 566, **Montezuma cubensis** Britton & Wilson. Seedlings of this Cuban species, grown from seeds sent to the Agricultural Experiment Station, Mayaguez, from the New York Botanical Garden, were seen in March, 1929. The tree has smaller leaves and flowers than the native *MAGA* of Porto Rico.

Vol. V, p. 567, **Gossypium brasiliense** Macf. The prior name for this species is **Gossypium lapideum** Tussac, Fl. Ant. 2: 67. 1818.

Vol. V, p. 568, add, 6. **Gossypium Marie-Galante** Watt, Kew Bull. 1927: 344. 1927.

Related to **Gossypium barbadense** L., with cotton readily separable from the black seeds. Leaves deeply cordate; flowers lemon-yellow, much smaller than those of *G. barbadense*, scarcely longer than the bractlets; middle lobe of the leaf elongate.

St. Croix:—Union Island, St. Vincent.

Vol. V, p. 568, add at end of MALVACEAE, **Lagunaria Petersonii** D.

Don, a tree of Australasia, introduced by the Forest Service, failed to establish itself.

Kokia drynarioides (Seem.) Lewton, a shrub of the Sandwich Islands, a single seedling of which was received by the Forest Service from the Bureau of Plant Industry in 1926, but did not survive. (*Gossypium drynarioides* Seem.)

Malvaviscus Malvaviscus (L.) Britton & Wilson (*Malvaviscus arboreus* Cav.) sent by Mr. Fairchild from St. Thomas in 1928; is a stellate-velvety shrub, 2 m. high or higher with broadly ovate petioled leaves and bright red flowers 3-4 cm. long. It is a native of Mexico.

Vol. V, p. 569, **Ceiba pentandra**, add note, several introductions of the East Indian tree, КАРОК, at the Mayaguez Experiment Station, 1910-1929, failed to establish it.

Vol. V, p. 569, add **Ceiba acuminata** (S. Wats.) Rose, POCHOTE, native of northwestern Mexico, was first introduced by seeds at the Mayaguez Experiment Station in 1915 and several subsequent introductions were made there through the Bureau of Plant Industry, with indifferent success, but in 1928, immense numbers of seeds from Sonora germinated there and at the Forest Station, Rio Piedras, grew rapidly and were widely distributed. Its foliage is similar to that of *C. pentandra*, but is stellate-pubescent, the leaflets shorter, and its flowers are very much larger, the petals up to 14 cm. long. (*Eriodendron acuminatum* S. Wats.)

Ceiba aesculifolia (H. B. K.) Britten & Baker, of southern Mexico, was also introduced by seed at the Mayaguez Station in 1926 and 1930, and germinated. It resembles *C. acuminata*, but has glabrous leaves and prickly twigs. (*Bombax aesculifolium* H. B. K.).

Vol. V, p. 570, **Adansonia digitata**, add record, many young trees 0.5 to 1.5 m. high, grown at the Mayaguez Experiment Station from seed of 1928, were seen there in December, 1929; grown also from seeds at Forest Station in 1930.

Add at end of BOMBACACEAE, **Cavanillesia platanifolia** (H. & B.) H. B. K., of Panama and Colombia, introduced by the Forest Service in 1927, forms a very large tree up to 50 m. high or higher, its broad leaves entire or 5-7-lobed, with pink flowers, the fruit a broadly 5-winged capsule, with thin wings 7-10 cm. wide (*Pourretia platanifolia* H. & B.)

Gossampinus buonopozensis (Beauv.) Bakh., of tropical Africa, grown from seed collected by Dr. David Fairchild in French Guiana at Chapman Field, Florida, was sent as seedlings to the Mayaguez Experiment Station in 1927. (*Bombax buonopozense* Beauv.).

Vol. V, p. 572, **Riedlea hirsuta** (Cav.) DC. The prior name for this species is **Riedlea villosa** (Mill.) Britton & Wilson (*Sida villosa* Mill. Gard. Dict. ed. 8, 1768).

Vol. V, p. 573, **Waltheria americana**, add note, observed forming a little tree, 2 m. high, in sandy soil near Punta Cangrejos, Porto Rico, February, 1927.

Vol. V, p. 574, **Theobroma pentagona**, add note, Mr. McClelland subsequently reported that after a study of these trees, Mr. Henri Pittier expressed the opinion that they were probably referable to some other species of *Theobroma*.

Vol. V, p. 576, **Sterculia apetala**, add, planted also in the Virgin Islands.

Sterculia foetida, add, reported as grown from seed at the Forest Station in 1930.

Vol. V, p. 578, add at end of OCHNACEAE, **Ochna mossambicensis** Klotzsch, a native of Mozambique, seen at the Trujillo Plant Propagation

Station in 1930, was well established there as a tree 1.2 m. high, about 3 years old, blooming in February. It has alternate, obovate, subcoriaceous, serrulate leaves 10-18 cm. long and bright yellow flowers in lateral racemes, borne on slender, jointed pedicels.

Vol. V, p. 584, **Calophyllum antillanum** Britton, add synonym *Calophyllum Jacquinii* Fawc. & Rendle, Fl. Jam. 5: 200. 1926.

Vol. V, p. 585, **Rheedia madruno**, add note, grown also at the Forest Station, Rio Piedras, as seedlings in 1927, and recorded as thrifty.

Vol. V, p. 585, add **Rheedia edulis** Tr. & Pl., of Central America and northern South America, an evergreen tree about 7 or 8 m. high, with glabrous twigs and foliage, collected on the estate of Dr. Caul, near Vega Alta, Porto Rico, has elliptic or lanceolate-oblong, stout-petioled, rather conspicuously veined leaves, 8-6 cm. long, the greenish-white flowers about 1 cm. broad, the ovoid or ellipsoid fruit 3 cm. long.

Rheedia Gardneriana Tr. & Pl., Brazilian, grown also on the estate of Dr. Caul, is a small tree with lustrous dark-green, lanceolate leaves 6-13 cm. long, the slender pedicels as long as the petioles, the suborbicular petals membranous.

Vol. V, p. 586, **Garcinia Livingstonii**, add, introduced also at the Trujillo Plant Propagation Station about 1927, had reached height of about 1 m. in December, 1929.

Add **Garcinia epunctata** Stapf., planted at the Trujillo Plant Propagation Station in 1927, but not established, is a tree with oblong, caudate-acuminate leaves about 12 cm. long, the flowers solitary or 2 together, yellow. It is a native of Liberia.

Garcinia dulcis (Roxb.) Kurz, seen as a young plant at the same place in December, 1929, is an East Indian, small tree with oblong, coriaceous, acuminate leaves 15-20 cm. long, nearly white flowers borne in fascicles on the branches, the yellow fruit as large as an apple. (*Xanthochymus dulcis* Roxb.).

Garcinia morella Desr., introduced also at the Trujillo Plant Propagation Station in 1929, native of India, becomes 10-15 m. high with thick-coriaceous leaves 10-15 cm. long, its small fruit subglobose, 4-seeded, about the size of a cherry.

Garcinia oblongifolia Champ., seen as trees about 2 m. high at the Trujillo Station in December, 1929, a native of Hongkong, China, has oblong leaves, narrowed at the base and short-petioled, its fruit described as smooth, the size of a small apple.

Vol. V, p. 587; Vol. VI, p. 362, **Tamarix articulata**, add, grown also at the Forest Station, Rio Piedras; an English name is **ATHOL**.

Vol. V, p. 587, add, **Tamarix gallica** L., **TAMARISK**, European, widely planted for ornament in temperate and tropical regions, was seen as a tree 6 m. high with a trunk about 2 dm. in diameter in a yard at Juana Diaz, in February, 1929, barren at that time. It has very slender twigs crowded with minute, scale-like leaves, the small white flowers in paniced spikes.

Vol. V, p. 593, add, **Myroxylon senticosum** (Hance) Warburg, Chinese, recorded by the Forest Service as experimentally introduced and thrifty in 1927, is described as a shrubby species with ovate leaves 12-16 mm. long, its staminate flowers racemose (*Xylosma senticosum* Hance).

Vol. V, p. 597, **Hydnocarpus castanea**, add record, the tree at the Insular Experiment Station had reached a height of about 4 m. in February, 1929; it flowered in April, 1928.

Vol. V, p. 597; Vol. VI, p. 362, **Taraktogenos Kurzii**, add record, trees at the Forest Station, Rio Piedras, had reached over 3 m. in height in 1929, and were transferred to the grounds of the Leper Hospital, some of these had reached 4 m. in height in February, 1930; add common name CHAULMOOGRA.

Vol. V, p. 597, (See Vol. VI, p. 363), add at end of FLACOURTIACEAE, **Oncoba spinosa** Forsk., an Arabian tree, recorded as thrifty by the Forest Service after introduction as seedlings, from the Bureau of Plant Industry about 1924, is related to *O. echinata*; it is a spiny shrub or small tree with elliptic, thin leaves and fragrant, showy, white flowers 5 cm. broad, the globose fruit 5 cm. in diameter; the seeds contain chaulmoogric acid.

Vol. V, p. 598, add note, another species of **Viola**, with ovate, obtuse, cordate, long-petioled, bluntly dentate leaves, grown in gardens on St. Thomas, was reported by Mr. Fairchild in 1930.

Vol. V, p. 604, add, **Passiflora edulis** Sims., South American, grown from seed at the St. Croix Experiment Station in 1929, has deeply 3-lobed serrate leaves, the white flowers often tinted with purple, the globose-oblong fruit thickly purple-dotted when ripe.

Vol. V, p. 606, **Begonia humilis**, add note, in cultivation on St. Thomas in January 1930.

Begonia odorata Willd., South American, attains a height of 3-6 dm., the obliquely ovate leaves 7-15 cm. long, the white flowers 2 cm. or more in diameter; it was also grown in St. Thomas gardens in 1930.

Begonia coronata Hort., of hybrid origin, was also in cultivation on St. Thomas in January 1930. We are indebted to Dr. A. D. Houghton for identification of these Begonias.

Vol. V, p. 607, **Mentzelia aspera**, add, illustrated in Addisonia, plate 504.

Vol. V, p. 608, **Pereskia saccharosa**, add record, Mr. Fairchild reports it as having done perfectly well on St. Thomas, both the original plant received by him and others raised from seed.

Vol. V, p. 609, **Opuntia repens**, add to distribution, abundant on rocky hillside, Cape San Juan, March, 1929.

Vol. V, p. 611, **Opuntia Dillenii**, a Porto Rican name is HIGO DEL MAR.

Vol. V, p. 611, **Opuntia rubescens**, add notes. A fine tree of the spineless race of this species 5 m. high was observed in a garden at Arroyo, Porto Rico, in 1927; cuttings from it, planted at that time, on the grounds of the Coamo Springs Hotel, were about 1.5 m. high in January, 1930. The parent tree was destroyed by the hurricane of September, 1928. A cutting taken at the same time by Chief Forester Kramer to the Forest Station at Rio Piedras, was also vigorous, nearly 2 m. high, and had commenced flowering in January, 1930, developing, vigorously, unexpectedly, in the much higher rainfall there than either at Arroyo or at Coamo. A large colony of the spiny race of the species, with both red and orange flowers, was observed at the foot of the headland, Cape San Juan, in February, 1930. A Porto Rico name is TUNA DE PETATE.

Classification has been improved by recognition of the genus **CONSOLEA** Lemaire as distinct from **Opuntia** to include the species with erect tree-like, unjointed trunks. This species is **Consolea rubescens** (Salm-Dyck) Lemaire, Rev. Hort. 1862: 174. 1862.

Opuntia moniliformis is **Consolea moniliformis** (L.) Britton, Journ. Cactus & Succ. Soc. 1: 228. 1930.

Vol. V, p. 612, add **Opuntia leptocaulis** DC. (*O. frutescens* Engelm.), a slender, cylindric-jointed species; **Opuntia imbricata** (Haw.) DC., (*O. arborescens*

Engelm.) with stout, cylindric, tubercled joints; and **Opuntia polyacantha** Haw. (*O. missouriensis* DC.), a flat-jointed, dry-fruited plant, are reported as introduced at the St. Croix Experiment Station from Texas in 1929.

Vol. V, p. 612, **Opuntia Lindheimeri**, add record, Mr. Fairchild reports this Texan species as still existing in his collection, but not vigorous.

Cephalocereus Royenii, add to distribution, foot of headland, Cape San Juan, in flower, February 1930.

Vol. V, p. 616, **Selenicereus pteranthus**, **S. Urbanianus** and **S. inermis** are all recorded by Mr. Fairchild as in good condition on St. Thomas in 1930, all having flowered.

Hylocereus guatemalensis, add record, reported by Mr. Fairchild as flourishing at Louisenhöj in 1930, having flowered there.

Vol. V, p. 616; Vol. VI, p. 363, add note, **Hylocereus costaricensis** did not survive at Monteflores, Porto Rico; the same record applies to **Hylocereus extensus**.

Vol. V, p. 616; Vol. VI, pp. 363, 364, add note, **Selenicereus Boeckmannii**, **S. Donkelaari** and **S. coniflorus** also failed to survive at Monteflores; **S. Boeckmannii**, however, is reported by Mr. Fairchild as in fair condition at Louisenhöj in 1930.

Vol. V, p. 617, **Cactus intortus**, add to distribution, coastal rocks, near foot of headland, Cape San Juan, in flower, February 1930. In March, 1930, Mr. F. M. Pennock moved a large number of young plants from southwestern Porto Rico to his commercial nursery at Sabana Llana.

Vol. V, p. 618, **Rhipsalis Cassutha**, add Porto Rico name PEGA PALO.

Vol. V, p. 619, **Mediocactus coccineus**, add record, reported by Mr. Fairchild in good condition at Louisenhöj in 1930.

Vol. V, p. 619, add **Neomammillaria meiacantha** (Engelm.) Britton & Rose, introduced at the St. Croix Experiment Station from Texas in 1929, is subglobose, 12–15 cm. in diameter, with large, milky tubercles without wool, and white flowers (*Mammillaria meiacantha* Engelm.).

Vol. V, p. 619, add, **Cereus validus** Haw. (*C. Forbesii* Otto) Argentinian, and **Cereus jamacaru** DC., Brazilian, tall, columnar, ribbed cacti, with white flowers, are reported by Mr. Thompson as grown from seed at the St. Croix Experiment Station in 1929.

Add, **Hamatocactus setispinus** (Engelm.) Britton & Rose, Texan, was introduced at Sabana Llana, Porto Rico in 1929, by Mr. Pennock, did not appear thrifty there in April, 1930; it was also planted at the St. Croix Experiment Station in 1929. It is a subglobose, ribbed cactus, 7–15 cm. high, with clusters of acicular spines, one of them hooked, the showy flowers yellow.

Echinocereus chloranthus (Engelm.) Rümpler, a low cylindric densely spinose plant, with yellowish-green, small flowers; **Echinocereus dasyacanthus** Engelm., similar, but with large yellow flowers; and **Echinocereus Blanckii** (Poselg.) Palmer (*E. Berlandieri* Engelm.) a slender, procumbent, tubercled species, with large purple flowers, are reported by Mr. Thompson as introduced from Texas, at the St. Croix Experiment Station in 1929.

Ferocactus Wislizeni (Engelm.) Britton & Rose, also reported by Mr. Thompson as introduced at the St. Croix Station from Texas in 1929, is a large, cylindric, deeply many-ribbed cactus, strongly armed with subulate, white to red spines, the large flowers red or yellow (*Echinocactus Wislizeni* Engelm.) Mr. Fairchild reports that this species did not succeed at Louisenhöj, St. Thomas, after introduction several years ago.

Vol. VI, p. 5, **Tetrazygia elaeagnoides**, add, illustrated in Addisonia, plate 443.

Vol. VI, p. 6, under **Tamonea guianensis**, add note, the barren specimens from the Sierra de Yabucoa, doubtfully referred by Urban (Symb. Ant. 4: 458) to **Miconia splendens**, have subsequently been determined by him as this species.

Vol. VI, p. 7, **Miconia affinis**, the plant collected only by Sintenis on Monte Santo de Leon, has been re-determined by Urban (Arkiv Bot. 22: Part 17, p. 33) as **Miconia microcarpa** DC., Prodr. 3: 189, known otherwise only from northern Brazil.

Vol. VI, p. 11, add at end of **Miconia**

15a **Miconia Ottoschulzii** Urban & Ekman; Urban, Arkiv Bot. 22¹⁷: 39. 1929.

A medium size tree or shrub, with a trunk 30–40 cm. in diameter, the branches obtusely angled. Leaves petioled, the petioles 7–15 mm. long, the blade ovate or ovate-elliptic, 8–15 cm. long, 4–7.5 cm. broad, acuminate at the apex, rounded, obtuse or acutish at the base, 3-nerved above the base, entire; inflorescence at apex of the branches, sessile or short-peduncled; petals white; filaments 2.5 mm. long, the anthers linear; berry subglobose, 3.5 mm. long, 4.5 mm. thick; seed subtriangular, 2 mm. in diameter.

Primeval forest at Isabon, Porto Rico, determined by Urban from a barren specimen collected by Sintenis many years ago:—Santo Domingo.

Vol. VI, p. 21, **Parsonsia micrantha**, add locality, dry serpentine slope, Guanajibo, near Mayaguez, December, 1929.

Parsonsia hyssopifolia (H. B. K.) Standley, Mexican, grown at the St. Croix Experiment Station in 1930, is a low shrub, 2–3 dm. high, with slender, strigose branches, the lanceolate leaves 1–2 cm. long, the small, violet flowers borne in the upper axils, with 6 petals and 11 stamens.

Vol. VI, p. 21, add **Lagerstroemia parviflora** Roxb., East Indian, received as seedlings at the Forest Station, Rio Piedras 1925–1926, from the Bureau of Plant Industry, and distributed, forms a tree up to about 20 m. with oblong, acute leaves 5–8 cm. long, the small, paniced flowers about 15 mm. broad.

Add at end of LYTHRACEAE, **Duabanga grandiflora** (Roxb.) Walp., a large tree of the related family BLATTIACEAE, was received as seedlings by the Forest Service from the Bureau of Plant Industry in 1926, but not established. It is native of British India and recorded as becoming 30 m. high or higher, with oblong leaves and large, white flowers.

Vol. VI, p. 24, **Bucida Buceras**, add Porto Rican name UCAR, commonly used for this tree.

Vol. VI, p. 26, the tree of the Myrtle Family at the Mayaguez Experiment Station, recorded, but not determined botanically, continued vigorous, and produced fruit abundantly; these are slender-peduncled in the axils of the leaves, globose, sweet, yellowish and soft; the embryo of the hard seeds is slightly curved. The flowers are 8 mm. broad, the calyx glandular. The origin of this tree is unknown. It may be designated **Psidium microphyllum** Britton. The type specimen was collected by T. B. McClelland, July 1930.

Vol. VI, p. 26, add, **Psidium littorale** Raddi, grown from seed by Mr. Fairchild at Louisenhoj, St. Thomas in 1923, obtained from the New York Botanical Garden, was reported by him in January 1930, as a small shrub already fruiting. It is similar to *P. Cattleianum* but with citron-colored fruit.

Vol. VI, p. 37, **Eugenia procera**, in distribution, strike out Jamaica; the species has been erroneously recorded from that island by previous authors.

Vol. VI, p. 40, under **Eugenia xerophytica**, add to description, pedicels slender, 10–11 mm. long; young fruit pyriform-globose, 5 mm. in diameter, the suborbicular sepals 3.5 mm. broad, Guanica, Porto Rico (*Stevens & Hess, 3109*).

Vol. VI, p. 41, **Eugenia Dombeyana**, add note, the plant grown at the Insular Experiment Station succumbed.

Add, **Eugenia aquea** Burm. f., introduced at the Trujillo Plant Propagation Station in 1927, was about 1 m. high in February 1929 and appeared to be established, but subsequently succumbed.

Add, **Jambos grandis** (Wight) Blume, grown at the Trujillo Station, introduced in 1927, was about 2.5 m. high in February 1930. It is native of India, where it forms a large tree, with large broad, elliptic to obovate leaves, its flowers sessile, in cymes, the fruit 2.5–3 cm. in diameter (*Eugenia grandis* Wight.).

Vol. VI, p. 42, add, under **Eucalyptus**, the total number of species experimentally introduced by the Forest Service up to 1930 was thirty.

Vol. VI, p. 43, add, **Bertholletia excelsa** Humb. & Bonpl., BRAZIL-NUT, Brazilian, grown at the Trujillo Station, from seed brought by Mr. Barrett from Trinidad in 1924, a large tree of the Family Lecythidaceae, was about 1.5 m. high in February, 1930. It has oblong coriaceous leaves, 1–3 dm. long, large fasciated flowers with 6 petals, the woody, subglobose fruit up to 1.5 dm. in diameter, the large seeds angled, edible.

Vol. VI, p. 43, 365, add **Lecythis usitata** Miers, SAPUCAYO NUT, in the collection at the Mayaguez Experiment Station, seen in March 1929 as a vigorous tree 15 m. high, has chartaceous elliptic leaves, racemose flowers, the fruit a subglobose, woody pyxis.

Vol. VI, p. 43, after **Couroupita** add **Napoleona imperialis** Beauv., an African tree, of the Family LECYTHIDACEAE, observed in 1916 at Martin Peña by collectors of the Agricultural Experiment Station, has alternate, coriaceous, oblong to oblanceolate, pointed smooth leaves 1–2 dm. long, variegated, solitary, axillary flowers 3–4 cm. broad, with numerous petioled staminodes; the fleshy, depressed-globose fruit about the size of a pomegranate.

Vol. VI, p. 46, **Jussiaea erecta**, add note, plants 2 m. high were observed in a marsh near Guayama in March, 1927.

Jussiaea angustifolia add, illustrated in Addisonia, plate 442.

Vol. VI, p. 48, **Didymopanax Morototoni**, add Porto Rico name LLAGRUMO MACHO, communicated by Hon. Carlos E. Chardon, also spelled YAGRUMO MACHO.

Vol. VI, p. 49, add at end of ARALIACEAE, **Mertya Sinclairi** Seem. native of New Zealand, introduced by the Forest Service, 1928 and recorded as thrifty, is a small tree with large, alternate, shining leaves and small, panicle, yellowish flowers.

Vol. VI, p. 52, **Foeniculum Foeniculum**, add, seen in cultivation, apparently luxuriant, at the Trujillo Plant Propagation Station in 1929.

Vol. VI, p. 53, **Celeri graveolens**, add note, the thick-rooted variety CELERIAC, is occasionally grown in Porto Rico mountain gardens.

Cerefolium Cerefolium, add, occasionally grown in Porto Rico gardens.

Vol. VI, p. 61, under **Rapanea ferruginea**, in synonymy strike out *Myrsine floribunda* R. Br.

Vol. VI, p. 63, for **Plumbago capensis** Thunb., read **Plumbago auriculata** Lam., the prior name.

Sapota Achras, add note, luxuriant trees fully 20 m. high, were observed in March, 1930, in the garden of "Los Nisperos" near Tallaboa, Porto Rico, growing under irrigation, and giving this charming garden, situated in a very dry district, its name.

Vol. VI, p. 65, under **Micropholis curvata**, synonym should read *Micropholis portoricensis curvata* Pierre, Notes Sapot. 39. 1891. Add Porto Rico name LECHÉ PRIETO.

Vol. VI, p. 67, after **Lucuma**, add 4a **PARALABATIA** Pierre, Notes Sapot. 23. 1890.

Small or medium-sized evergreen trees, the branches unarmed. Calyx 4- or 5-lobed. Corolla 4- or 5-lobed, the lobes unappendaged. Stamens 4 or 5, borne on the corolla-tube opposite its lobes, the filaments short, the anthers ovate; staminoides 4 or 5, borne at the sinuses of the corolla. Ovary 2- or 3-celled. Fruit a 1-seeded berry. Seed globose. Cotyledones plano-convex, slightly adherent at the margin. (Compound word, first part Greek, meaning near Labatia). About 3 species, natives of the West Indies.

Type species: *Labatia dictyoneura* Griseb.

1. **Paralabatia portoricensis** Britton & Wilson, Bull. Torr. Club 53: 471. 1926.

A tree 15 m. or more high, the twigs clothed with appressed ferruginous hairs. Leaves oblong-lanceolate, 6-11 cm. long, 2.5-4 cm. wide, acute or obtuse at the apex, rounded or somewhat acutish at the base, glabrous above except on the midvein, loosely pubescent beneath with rather long whitish hairs, the petioles about 1.5 cm. long; calyx-lobes oblong-elliptic, 2 mm. long, pubescent on the back; corolla-lobes broadly elliptic to oval, 1.5 mm. long; staminoides filament-like.

On limestone hills, northern Porto Rico. Endemic.

Vol. VI, p. 71, **Bumelia Krugii**, add to description, fruit subglobose, 4.5 m. in diameter.

Vol. VI, p. 72, **Manilkara nitida**, add Porto Rico name AUSUBO.

Mimusops marginata, the plant in the collection at Mayaguez, seen again in March 1929, had made scarcely any growth, appearing as if unadapted to the climate.

Vol. VI, p. 72, add at end of SAPOTACEAE, **Malacantha Warneckiana** Engler, received by the Agricultural Experiment Station, Mayaguez, from the Bureau of Plant Industry in 1929, was vigorous and about 3 dm. high in January 1930. It is native of the Gold Coast, where it forms a shrub; the leaves are obovate, about 1.5 dm. long, the fruit is a red berry, similar to a coffee berry, containing one seed in sweet, yellow pulp.

Vol. VI, p. 74, **Diospyros ebenaster**, add Porto Rico name SAPOTE NEGRO.

Add **Diospyros Ebeneum** König, EBONY, East Indian, introduced at the Forest Station, Rio Piedras in 1928, forms a large tree, with black heart-wood; its oblong leaves are 5-10 cm. long, the glabrous fruit about 2 cm. in diameter.

Vol. VI, p. 80, **Jasminum azoricum**, add locality, roadside near Tallaboa, 1930.

Vol. VI, p. 80, add **Jasminum primulinum** Hemsl., PRIMROSE JASMINE, Chinese, was also grown by Mr. Fairchild at Louisenhoj, St. Thomas, in 1930.

Vol. VI, p. 81, 367, **Olea europaea**, add note, introduction of the OLIVE at the Agricultural Experiment Station, Mayaguez, was disappointing, young trees seen in March, 1929, being unthrifty. Mr. A. S. Fairchild reported to us several

healthy trees on St. Thomas in January, 1930, some brought by him from California, others of larger size.

Vol. VI, p. 81, add at end of OLEACEAE, **Nyctanthus Arbor-tristis** L., NIGHT JASMINE, East Indian, grown from seed by the Forest Service in 1925, and recorded as thrifty, is a night-flowering shrub or small tree with four-angled branches, ovate acuminate leaves, its very fragrant flowers with a salverform corolla, its limb white, its long tube bright yellow; the flowers fall off about sunrise.

Fraxinus velutina Torrey, ARIZONA OR VELVET ASH, of the southwestern United States, raised from California seed of 1928, under this name, at the St. Croix Experiment Station, was recorded as about 2 m. high and vigorous in April, 1930. It forms a rather small tree, the pinnate leaves with from 3 to 9 leaflets, the spatulate samaras 2.5 to 3.5 cm. long.

Fraxinus chinensis Roxb., WHITE WAX TREE, Chinese, received from the Bureau of Plant Industry at the Forest Station, Rio Piedras, in 1927, forms a tree up to about 13 m. high with pinnate leaves of 5-9 coriaceous, glabrous leaflets 5-10 cm. long, the apex acuminate; the small, panicked flowers appear with the leaves; the samara is oblanceolate, about 4 cm. long.

Ligustrum ionandrum Diels, a Chinese species, grown at the Forest Station from plants received from the same source 1925-1926, is a shrub 2-3 m. high, the small, short-racemose flowers about 5 mm. long, the elliptic-obovate leaves 3 cm. long, 1.5 cm. wide.

Ligustrum sinense Lour., of China and Korea, also recorded by the Forest Service, under the name AMUR RIVER PRIVET, has elliptic, acute leaves 3-7 cm. long, the small white flowers in dense terminal panicles.

Ligustrum acutissimum Koehne., Chinese, with lanceolate, acuminate leaves; **L. japonicum** Hamilt., Asiatic, the ovate or ovate-oblong, acute or obtusish leaves red-margined; **L. nepalense** Wall., Himalayan, an evergreen shrub or tree with pubescent branches, the leaves oblong, acuminate, and **L. Quihoni** Carr., Chinese, with spreading branches, the leaves elliptic-oblong or narrowly oblong, obtuse, are reported by Mr. Thompson as grown from seed at the St. Croix Experiment Station in 1929 and 1930.

Vol. VI, p. 82, add **Buddleia asiatica** Lour., grown at the Forest Station, Rio Piedras, in 1927, is a shrub or small tree, native of tropical Asia, with lanceolate acuminate leaves 10-20 cm. long, tomentose beneath, and small, white, fragrant flowers in very slender, drooping panicles.

Buddleia nivea Duthie, grown at the same Station at the same time, native of western China, is a shrub with ovate-lanceolate leaves 10-18 cm. long, densely white-tomentose beneath, the small purple flowers borne in long panicles. Both this and the preceding species are highly ornamental when in bloom.

Vol. VI, p. 85, **Nymphoides Humboldtianum**, add, illustrated in Addisonia, plate 365.

Vol. VI, p. 88, third line, for "follicles 1.5-2.5 cm. long," read 1.5-2.5 dm.

Vol. VI, p. 89, **Tabernaemontana coronaria** Jacq. The prior name is **Tabernaemontana divaricata** (L.) R. Br. (*Nerium divaricatum* L.).

Vol. VI, p. 94, **Arduina Carandas**, add note, the plants grown at the Insular Experiment Station succumbed, but others were subsequently introduced at the Trujillo Plant Propagation Station and were healthy in 1929. Luxuriant shrubs at the Mayaguez Station, with broadly ovate leaves and well-flavored fruit, were about 2 m. high in 1930, apparently a race of this species, recorded as of Indian origin.

Vol. VI, p. 94, add at end of APOCYNACEAE, **Holarrhena antidysenterica** (Roxb.) Wall., CONESSI-BARK, a small tree, native of British India, was received by the Forest Station in 1926, from the Bureau of Plant Industry, as seedlings, which did not survive (*Echites antidysenterica* Roxb.)

Mandevilla suaveolens Lindl., a decorative, glabrous woody vine, native of Argentina, with ovate, cordate leaves, and large, fragrant white flowers, was introduced by the Forest Service in 1926-1927.

Odontadenia grandiflora (Meyer) Schumann, (*Odontadenia speciosa* Benth.) grown in 1926 at the Trujillo Plant Propagation Station, from seeds received from the Botanical Garden at Georgetown, British Guiana, had reached a length of about 4 m. in April, 1930, flowering profusely. It is a woody vine with large, elliptic, opposite, entire leaves and showy, yellow, corymbose flowers 4-5 cm. long, the fruit a large follicle.

Alstonia scholaris (L.) R. Br., an East Indian tree, with verticillate leaves, the follicles long and slender, grown from seed at the Forest Station in 1929, was 8 dm. high in 1930 (*Echites scholaris* L.)

Vol. VI, p. 95, **Asclepias curassavica**. The race with pure yellow flowers was found sparingly at Laguna Tortuguero, March 28, 1928, detected by Mrs. Britton during a field-day, with faculty members of the University of Porto Rico.

Vol. VI, p. 101, add **Cryptostegia madagascariensis** Hemsl., Madagascan, is reported as grown from seed at the St. Croix Experiment Station in 1929. It is a glabrous climbing shrub with short-petioled leathery leaves 6-10 cm. long, the pink or whitish flowers 6-7 cm. in diameter, the lobes longer than the tube.

Vol. VI, p. 104, **Evolvulus sericeus**, add locality, in shade, limestone hill near Guayanilla, February, 1927.

Vol. VI, p. 106, **Jacquemontia subsalina**, add note, the vine becomes longer than 5 dm.; plants observed near the type locality between Ponce and Santa Isabel, in February, 1930, were fully 2 m. in length, after a period of high rainfall. Illustrated in Addisonia, plate 499.

Vol. VI, p. 106, under **Jacquemontia verticillata**, add to distribution, palm thicket on Ponce Limestone, between Ponce and Tallaboa.

Vol. VI, p. 110, **Exogonium arenarium**, add to distribution, Bahia Puerco, eastern coast of Porto Rico, February, 1927. Illustrated in Addisonia, plate 402.

Vol. VI, p. 111, **Ipomoea polyanthes**, add, illustrated in Addisonia, plate 441.

Vol. VI, p. 112, **Ipomoea cathartica**, add note: a small-flowered race of this species, the corolla 5-6 cm. long, rose-colored at midday, was observed by Mrs. Horne on roadside at Kilometer post 76, between Cayey and Aibonito in 1928.

Vol. VI, p. 114, **Ipomoea quinquefolia**, add, illustrated in Addisonia, plate 384.

Vol. VI, p. 117, add, **Ipomoea crassicaulis** (Benth.) B. L. Robinson (*I. fistulosa* Mart.) of continental tropical America, sent by Mr. Fairchild from St. Thomas, in 1928, is an erect shrubby species, with long-acuminate, subsagittate leaves, and bright pinkish flowers 6-8 cm. long, the capsule about 8 cm. long, the large seeds long-woolly. It is also grown in gardens on the dry southern side of Porto Rico.

Vol. VI, p. 123, **Cerdana alliodora**, add Porto Rico name CAPA PRIETO.

Vol. VI, p. 125, **Cordia glabra** L., add to distribution, Central America and northern South America.

Vol. VI, p. 134, read **Schobera angiosperma** Murr.; Scop. Intr. 158. 1777.

Vol. VI, p. 135, **Heliotropium inundatum** Sw., the prior specific name is **Heliotropium procumbens** Mill. Gard. Dict. ed. 8, no. 10. 1768.

Vol. VI, p. 137, for **Heliotropium peruvianum** L. read **Heliotropium arborescens** L. the prior name.

Heliotropium corymbosum R. & P., LARGE-FLOWERED HELIOTROPE, grown by Mrs. McKay-Jones at Hacienda Limon, in 1930, resembles the Garden Heliotrope, but is taller, with broader leaves and larger flowers. This plant is sometimes called CHERRY PIE, and is probably of hybrid origin.

Vol. VI, p. 137, 369, **Cochranea anchusaefolia**, the older name for this garden plant, grown also in St. Thomas, is **Heliophytum amplexicaule** (Vahl.) Britton & Wilson. It was observed growing spontaneously in the Governor's Garden, Rio Piedras, in April, 1930, (*Heliotropium amplexicaule* Vahl.)

Vol. VI, p. 137, add, **Cynoglossum furcatum** Wall., of India and Ceylon, seen in Mrs. McKay-Jones' garden, Hacienda Limon, Porto Rico, in 1930, is about 6 dm. tall, the oblong-lanceolate acuminate leaves sessile, the small blue flowers in panicked-spikes, the fruit rough.

Vol. VI, p. 137, **Borago officinalis**, add record, luxuriant in cultivation at the Trujillo Plant Propagation Station, in January 1929, but had disappeared in March, 1930.

Vol. VI, p. 140, add, after **Lantana involucrata**
3a **Lantana reticulata** Pers. Syn. 2: 141. 1807.

A rather densely pubescent shrub, 1-1.5 m. high; leaves ovate, acutish or obtuse, 1.5-4 cm. long, pubescent on both sides, rugose-bullate, crenate; peduncles mostly longer than the leaves; heads hemispheric, several-flowered, the involucre bracts ovate; corolla purplish, its tube about 6 mm. long, about as long as the bracts; drupes about 3 mm. in diameter.

Hillside, Barrio de Lapa, north of Salinas, Porto Rico, March 1927: Cuba; Jamaica; Hispaniola; Mexico.

Add, **Lantana alba** Mill., seen at the Trujillo Plant Propagation Station in April, 1930, is an unarmed shrub with ovate, serrate leaves, the flowers white.

Vol. VI, p. 145, in generic description of **Citharexylum**, for "alternate leaves," read "leaves mostly opposite."

Vol. VI, p. 148, **Petitia domingensis**, add Porto Rico name CAPA BLANCO, communicated by Mr. C. Z. Bates.

Vol. VI, p. 149, add **Vitex quinata** (Lour.) Williams (*Cornutia quinata* Lour.) of southeastern Asia, recorded as thrifty after introduction by the Forest Service, is a tree with 3-5-foliolate leaves, the leaflets acuminate, the small flowers in pubescent panicles.

Vitex Agnus-castus, add record, luxuriant, about 1.5 m. high and freely flowering in Mrs. Vaughan's garden, Bayamon, December, 1929.

Vol. VI, p. 150, **Volkameria aculeata**, add, illustrated in Addisonia, plate 447.

Vol. VI, p. 152, p. 370, **Petraea volubilis**, add record, a cutting brought from St. Thomas by Mr. Barrett, was seen at the Trujillo Plant Propagation Station, successfully established in January, 1929, but not appearing thrifty in March, 1930, flowering sparingly. It was previously introduced from the Lesser

Antilles, at the Mayaguez Agricultural Station by Mr. May, and a fine flowering specimen was sent to us in April, 1930.

Vol. VI, p. 153, **Scutellaria havanensis** Jacq. Mr. E. C. Leonard (Contr. U. S. Nat Herb. 22: 737. 1927), has described the Porto Rico plant as *S. havanensis portoricensis* Leonard, but it does not appear to be different from Cuban specimens.

Vol. VI, p. 160, **Coleus rotundifolius**, add note, the plant was established and distributed, but was subsequently attacked by a root-disease.

Vol. VI, p. 162, **Nepeta Cataria**, add record, CATNEP did not prove to be persistent in the climate of Porto Rico at Trujillo; the same record applies to **Melissa officinalis** and to **Hyssopus officinalis**.

Add **Stachys lanata** Jacq., grown by Mrs. McKay-Jones at Hacienda Limon, above Villalba, in 1930, is a white-woolly perennial, with oblong leaves and small, blue flowers in interrupted spikes.

Vol. VI, p. 163, **Acnistus arborescens**, add, illustrated in Addisonia, plate 502.

Vol. VI, p. 166, **Solanum nigrum**. Recent intensive studies by George Bitter and others, of the great number of plants which have been referred to this species, appear to demonstrate that numerous distinct species must be recognized, all different from the European type of *S. nigrum*. For the Porto Rico and Virgin Island plant, the name **Solanum caribaeum** Dunal appears to be available; this species is distributed throughout the West Indies.

Vol. VI, p. 167, add, 1a **Solanum pterocaulon** Dunal, Hist. Sol. 153. 1813.

Annual, herbaceous, glabrous, the branches angled and subspinulose. Leaves ovate to ovate-lanceolate, acuminate, sinuate-dentate, about 6 cm. long or shorter; peduncles lateral, umbellately several-flowered; corolla violet; berry black, globose, about 8 mm. in diameter.

Found by Dr. Otto Kuntze at Caguas, Porto Rico, in 1874; Mexico; South America.

Vol. VI, p. 171, **Solanum tuberosum**, add note, Mr. Walter McKay-Jones reported to us in March, 1930, successful cultivation of POTATOES at an altitude of about 600 meters above Villalba.

Vol. VI, p. 171, add **Solanum Wrightii** Benth., originally described as from Hong Kong, is a small tree, armed with straight, stout prickles, the large leaves variously lobed, scabrous with copious, short simple hairs on the upper surface, pale and densely stellate-pubescent beneath; the large blue flowers are in forked lateral cymes, the calyx hispid, the corolla 4 or 5 cm. broad; the fruit is a black globose berry 4 cm. in diameter. Luxuriant plants of this striking species were seen at the Insular Agricultural Experiment Station, Rio Piedras, in March, 1929, raised from seeds brought by Dr. Mel T. Cook from the Canal Zone in August, 1927.

Vol. VI, p. 172, add, **Solanum Nollanum** Britton, sp. nov.

Herbaceous, stout, erect, about 1.3 m. high, densely clothed with stalked, stellate hairs, and bearing scattered, short, yellow, glabrous prickles. Petioles stout, 6-10 cm. long; leaves ovate in outline, 2-4 dm. long, subsagittate, green beneath, purple above, rather flaccid, coarsely 9-11-toothed on each margin with acute, triangular teeth 1-3 cm. long, the stout midvein and the several lateral veins elevated beneath, the venation impressed above; flowers short-racemose in the upper axils; the pedicels and calyx densely stellate-pubescent; pedicels stout, 1-2 cm. long; calyx campanulate, about 17 mm. long, with ovate, acute teeth; corolla white, about 4 cm. broad, deeply lobed, its oblong-lanceolate, acute segments loosely stellate-pubescent without, glabrous within; anthers lanceolate,

glabrous, short-beaked, 2-porose, much shorter than the corolla-segments; ovary and young fruit densely long-hairy; "fruit obovoid or oval, about 5 cm. long, yellow."

Grown from seed at the Insular Agricultural Experiment Station, Rio Piedras, Porto Rico, collected by Mr. J. A. B. Nolla in the Valley of Cauca, Colombia in 1929. Type collected by Mr. Nolla at Rio Piedras, March 24, 1930 (New York Botanical Garden 9516).

Vol. VI, p. 175, *Cestrum laurifolium*, add, illustrated in Addisonia, plate 501.

Vol. VI, p. 175, add *Datura chlorantha* Hook., YELLOW-FLOWERED THORN-APPLE, origin unknown, was seen at the Insular Experiment Station, Rio Piedras, in April 1930. It is about 1 m. high with coarsely dentate leaves, the yellow, double flowers about 16 cm. long, the depressed-globose, short-tuberculate capsule 3-4 cm. in diameter.

Vol. VI, p. 182, 370, *Bramia Monnieri*, add note, plants from the limestone hillside near Ciales were examined side by side with others from subsaline soil near Santurce in February, 1927; no specific differences were detected.

Vol. VI, p. 188, *Angelonia salicariaefolia*, add, illustrated in Addisonia, plate 396.

Vol. VI, p. 189, *Agalinis fasciculata*, add, illustrated in Addisonia, plate 408.

Vol. VI, p. 193, *Distictis lactiflora*, add, illustrated in Addisonia, plate 336.

Vol. VI, p. 195, *Tabebuia haemantha*, add, illustrated in Addisonia, plate 333.

Vol. VI, p. 197, *Tabebuia glomerata*, the large tree in the Mayaguez collections was destroyed by the hurricane of September, 1928, but young trees had been obtained from seed and were about 3 m. high in December, 1929. This tree was seen also at the Insular Experiment Station, Rio Piedras, flowering in 1930.

Tabebuia argentea proved to be persistent at Mayaguez and trees 4 m. high were seen there in 1929.

Vol. VI, p. 200, *Macrocatalpa longissima*, add notes: planted at the College of Agriculture, Mayaguez, where a tree 5 m. high was seen in February, 1927; Professor H. C. Cowles reports that this tree flowered, but was subsequently destroyed, inadvertently.

Vol. VI, p. 200, *Spathodea campanulata*, add to description, fruit woody, subcylindric, about 3 dm. long and 2.5 cm. thick, bluntly rather long-pointed, somewhat puberulent.

Vol. VI, p. 200, *Spathodea nilotica*, add, the trees at the Forest Station were vigorous and about 8 m. high in 1929, but had not flowered. A tree at the Mayaguez Experiment Station was seen in fruit in December, 1929; this differs from *S. campanulata*, in having thicker stronger veined, less sharply acute and more densely puberulent leaflets, the fruit shorter, puberulent, scarcely pointed; the flowers were obtained by Mr. McClelland in 1930.

Vol. VI, p. 201, *Kigelia pinnata*, add record, a young tree about 1.5 m. high was reported from the St. Croix Experiment Station in 1930. The tree in the Mayaguez collection continued luxuriant in 1930.

Vol. VI, p. 201, *Paulownia Fortunei*, add record, this tree did not continue development, being evidently unadapted to the climate; at least at low elevation.

Paulownia tomentosa, this species is also unadapted to the climate. The record of its introduction at Mayaguez is apparently based on erroneous information.

Add, at end of BIGNONIACEAE, **Markhamia lanata** K. Schum., a tree of Tropical Africa, was introduced at the Mayaguez Experiment Station through the Bureau of Plant Industry, in 1925; it grew luxuriantly, reached height of about 12 m. and flowered in 1930; the pinnate leaves and the twigs are densely pubescent; the characteristic pseudostipules are subulate; the large, showy, yellow flowers form large panicles, and fine specimens were received from Mr. McClelland.

Vol. VI, p. 203, **Martynia louisiana**, add note, the cultivation of this plant was not continued at the Trujillo Station.

Vol. VI, p. 204, **Columnnea Tulae**, add, illustrated in *Addisonia*, plate 445.

Vol. VI, p. 206, **Pentarrhaphia albiflora**, add Porto Rico name ARBOL DE NAVIDAD. Illustrated in *Addisonia*, plate 448.

Vol. VI, p. 207, add, **Gloxinia perennis** (L.) Druce, introduced through the Trujillo Plant Propagation Station and grown in Porto Rico flower gardens, is a stout perennial, with large, succulent, broadly ovate, serrate leaves and large blue flowers in terminal bracted racemes, the subcampanulate corolla 3-4 cm. long (*Martynia perennis* L., *Gloxinia maculata* L'Her.).

Vol. VI, p. 207, **Saintpaulia ionantha**, add record, persistent at the Trujillo Station up to 1930.

Vol. VI, p. 207, add, **Isoloma bogotense** Nichols, reported as occasionally grown in Porto Rico flower gardens, is a pubescent perennial herb 3-6 dm. high, native of Columbia, with ovate, serrate, petioled leaves 5-10 cm. long, the long-peduncled axillary, solitary red and yellow flowers 3-4 cm. long, the tubular, oblique corolla-tube longer than the obtusely lobed limb. (*Isoloma Tydaea* Bailey).

Vol. VI, p. 209, add **Thunbergia laurifolia** Lindl., of India, seen in luxuriant cultivation on the estate of Mrs. Vaughan, Bayamon, in January, 1930, is a vine with lanceolate or lance-ovate leaves 7-13 cm. long; its light blue flowers with a whitish or yellowish throat, are about 7.5 cm. broad.

Vol. VI, p. 212, **Barleria Prionitis**, add, illustrated in *Addisonia*, plate 329.

Vol. VI, p. 212, for **Barleria aristata**, read **B. cristata**; add grown also in St. Thomas gardens, and elsewhere in Porto Rico.

Vol. VI, p. 214, **Gerardia portoricensis**, add to description, bracts linear, acute, glabrous above, long-ciliate with white hairs, 6-7 mm. long; peduncle 1-2 cm. long; spike about 4 cm. long or shorter, becoming lax and slender; perianth (?) at least of uppermost flowers, calyptroid, whitish, falling away; capsule oblong-ob lanceolate, densely puberulent, as long as the upper bract or a little shorter, tipped by the short, filiform style.

Vol. VI, p. 218, **Stethoma pectoralis**, add note, observed planted in a garden near Toa Baja, for use as a domestic remedy.

Vol. VI, p. 221, add at end of MYPORACEAE, **Myoporum acuminatum** R. Br., Australian, a glabrous shrub with lanceolate, entire, rather thin leaves, the apex long-acuminate, received at the Mayaguez Experiment Station from the Bureau of Plant Industry in 1928, was about 1 m. high in January 1930, but had not flowered; the specific identification is somewhat doubtful.

Vol. VI, p. 224, **Oldenlandia corymbosa**, add to distribution, sandy soil, Convent of the Sacred Heart, Monteflores, January, 1929 (*Britton 9180*).

Vol. VI, p. 233, **Hamelia erecta**, add note, a yellow-flowered race of this species was observed near Aibonito in 1929, the rather stout corolla 15 mm. long.

Vol. VI, p. 237, add, 1 a **Stenostomum portoricense** Britton & Wilson, sp. nov.

A tree 10 m. high, the twigs slender, grayish-brown, glabrous. Leaves elliptic, subcoriaceous, 6–13 cm. long, 2.6–6.5 cm. broad, pinnately veined, glabrous, dull, obtuse or bluntly short-acuminate at the apex, narrowed or obtuse at the base, the stout petiole 2–8 mm. long; cyme-branches slender, 1.5–3.5 cm. long; fruit ellipsoid, 7–9 mm. long, 5–6 mm. in diameter, 4-celled.

Limestone hills, northern Porto Rico. Type collected at Candelaria, January 17, 1929 (*Britton 9150*). Related to *Stenostomum obtusifolium* (Urban) Britton & Wilson, but differing in its more slender cyme-branches and shorter 4-celled fruit; differs from typical *S. coriaceum* (Vahl) Griseb., in shorter and stouter petioles and 4-celled fruit.

Vol. VI, p. 238, **Stenostomum acutatum** DC., add note, the flowers are fragrant and the fruit black.

Vol. VI, p. 239, **Laugeria resinosa**, add to distribution, coastal forest, Sardinera, near Dorado, January, 1929.

Vol. VI, p. 243, **Ixora lutea** and **Ixora parviflora** were both successfully established and flowered at the Trujillo Station, but were broken by the hurricane of September, 1928.

Vol. VI, p. 245, **Psychotria pinularis**, the prior name is: **Psychotria microdon** (DC) Urban, Symb. Ant. 9: 539. 1928.

Rondeletia microdon DC. Prodr. 4: 408. 1830.

Vol. VI, p. 247, **Psychotria brachiata** add to description, fruit ranging to subglobose and sparingly pubescent, sometimes enlarged to 5 or 6 mm. in diameter, apparently abnormally, as shown by specimens collected by Professor Charles E. Horne in a gully at Reservoir Hill near Guanabo, and painted by Mrs. Horne in 1929.

Vol. VI, p. 253, **Ernodea littoralis**, add note, observed forming a shrub 2 m. high near Cape San Juan.

Vol. VI, p. 258, **Mitracarpus hirtus**, add note, abundant in sandy cultivated soil near Candelaria, 1929.

Vol. VI, p. 258, **Warscewiczia coccinea**, add record, the trees at the Mayaguez Experiment Station were about 3 m. high and luxuriant in March, 1929.

Vol. VI, p. 259, add at end of RUBIACEAE, **Posoqueria latifolia** (Lam.) R. & S., introduced at the Trujillo Plant Propagation Station in 1927, and also at the Agricultural Experiment Station, Mayaguez in 1928, is a shrub, native of the southern West Indies and northern South America, with coriaceous, ovate leaves 10–15 cm. long, the large showy, white flowers corymbose, the salverform corolla with a very slender tube 8–15 cm. long, the limb 2–3 cm. broad.

Cinchona succirubra Pavon, PERUVIAN BARK, native of the Peruvian Andes, one of the trees yielding quinine, is recorded by the Forest Service as grown from seed at Rio Piedras in 1925, soon reaching a height of about 4 dm. and apparently thrifty, but the young trees were accidentally eliminated from the nursery.

Cinchona Ledgeriana Moens, a related tree of Bolivia, was grown from seed at the same time and place, and showed similar elimination. *Cinchonas* are trees with broad evergreen leaves, bitter bark, paniced salverform pink flowers, the fruit capsular.

Pentas lanceolata (Forsk.) Schumann, native of Tropical Africa, grown in gardens on St. Thomas and recorded by the Forest Service as introduced into Porto Rico prior to 1928, but not established, is suffrutescent, 3–6 dm. high, the

ovate to lanceolate leaves 2.5–15 cm. long, the purplish flowers in terminal cymes, with a very slender corolla-tube 2–3 cm. long, its spreading 5-lobed limb 12–15 mm. broad. (*Ophiorrhiza lanceolata* Forsk., *Pentstemon carnea* Benth.)

Vol. VI, p. 260, **Abelia grandiflora**, add note, this shrub proved to be unadapted to the climate, and succumbed.

Vol. VI, p. 263, **Momordica cochinchinensis**, add record, grown also in St. Thomas gardens.

Vol. VI, p. 273, add note at end of LOBELIACEAE, a barren specimen of a plant of this family apparently about 3 dm. high, with ovate-lanceolate, acuminate, denticulate, short-petioled leaves about 4 cm. long, was found on the summit of Cerro de la Punta by Gleason and Cook, in March, 1926 (*P.* 54). The foliage resembles that of *Lobelia rotundifolia* Juss., of Hispaniola.

Vol. VI, p. 276, **Leontodon Taraxacum**, add note, the DANDELION did not withstand the climate of Porto Rico at Trujillo.

Vol. VI, p. 283, **Vernonia cinerea**, classification is improved by recognition of the genus **Senecioides** (L.) Post and Kuntze, for this herbaceous, annual plant; it is **Senecioides cinerea** (L.) Kuntze; Post & Kuntze, Lex. Gen. Phan. 515. 1904. It is there cited as the generic type.

Vol. VI, p. 288, **Osmia geraniifolia**, add note, plants with leaves much less deeply lobed than in typical specimen were observed above Villalba in December 1929 (*Britton* 9356).

Vol. VI, p. 288, **Osmia borinquensis**, add, illustrated in Addisonia, *Plate* 357.

Vol. VI, p. 289, **Eupatorium triplinerve**, add record, grown also on St. Thomas. Mr. Fairchild notes that it is used for a beverage under the name JAPONA.

Vol. VI, p. 297, **Pluchea purpurascens**, add note, observed growing on the dry serpentine slope at Guanajibo, near Mayaguez, December, 1930.

Vol. VI, p. 298, **Pterocaulon virgatum**, add locality, moist plain near Boqueron, 1929.

Vol. VI, p. 307, in Key to **Tithonia** first line, for 2–2.5 mm. long read cm. long

Vol. VI, p. 314, add **Cosmos bipinnatus** Cav., Mexican, occasionally grown in Porto Rico flower gardens, is an annual herb, with pinnately divided leaves, their several segments very narrow; the ray-flowers white or pink.

Vol. VI, p. 319, after **Pectis febrifuga**, add 6a **Pectis floribunda** A. Rich, in Sagra, Hist. Cuba 11: 36. 1850.

Pectis Plumieri Griseb. Fl. Brit. W. Ind. 378. 1861.

Erect, 0.7–6.5 dm. high, the branches long and often rather slender, ascending. Leaves linear, 1–5 cm. long, 1–3 mm. wide, mucronate or bristle-tipped, with 3–5 pairs of bristles near the base; glands many in 4–6 irregular rows; heads cymose paniculate; peduncles usually shorter than the heads; involucre 4–5 mm. high, 3–4 mm. broad; bracts 5, acute or acuminate, obtusely keeled, glabrous; ray-flowers 3–5, their corolla 4–4.5 mm. long; disk-flowers 2–5, corolla 2.5–3 mm. long; achenes about 2 mm. long, hirsutulous; pappus-bristles of the disk-flowers about 8, of the ray-flowers about 5.

Pueblo Viejo, Porto Rico, J. A. Stevenson, March 10, 1916; Cuba; Jamaica; Hispaniola; British Guiana. Determined for us by Dr. P. A. Rydberg.

Vol. VI, p. 322, **Proustia Krugiana**, add, illustrated in Addisonia, *plate* 500.

Vol. VI, p. 323, add note, **Anthemis nobilis**, add note, CHAMOMILE did not withstand the climate of Porto Rico at Trujillo.

Vol. VI, p. 324, **Solidago sempervirens**, add note, the GOLDEN-ROD grown at the Trujillo Station is better referred to **Solidago mexicana** L., formerly included in **S. sempervirens**, but differing in its smaller flower-heads.

Vol. VI, p. 324, add, **Solidago microglossa** DC., native of Brazil and Argentina, grown in Virgin Island gardens, has linear to oblong-lanceolate, thin, serrate, triplinerved leaves, the small flower-heads in dense, 1-sided panicles, Father Duss records that this species was introduced into Guadeloupe in 1894.

Vol. VI, p. 324, add, **Dahlia Mazonii**, Guatemalan, sent from New York Botanical Garden to the Agricultural Experiment Station at Mayaguez in 1927, grew vigorously until May, 1928, when it succumbed.

Add, **Chrysanthemum maximum** Ramond., SHASTA DAISY, of South-eastern Europe, seen growing luxuriantly and flowering in April, 1930, at Mrs. Ellsworth's garden near Cidra, is perennial, with simple, erect stems about 5 dm. high, the lower leaves oblong, petioled, obtuse, the upper linear and smaller, the head of flowers with numerous white rays 3-4 cm. long.

Add, **Arctotis stoechadifolia** Berg., BLUE ARCTOTIS, South African, also grown by Mrs. Ellsworth, is a whitish-velvety herb, 3-6 dm. high, with variously lobed leaves 7-15 cm. long, the few or solitary long-peduncled flower-heads with pale-blue rays about 2 cm. long.

Vol. VI, p. 324, **Montanoa hibiscifolia**, add record, at the Trujillo Propagation Station, this shrub continued luxuriant and was observed again in 1930.

Artemisia Absinthium, add note, grown also by Mr. Fairchild at Louisenhøj, St. Thomas in 1929.

Vol. VI, p. 325, add at end of CARDUACEAE, **Brachylaena Hutchinsii** Hutchinson, native of British East Africa, one of the few large trees of this family, was sent as seedlings to the Forest Service by the Bureau of Plant Industry in 1926, but did not establish itself.

Vol. VI, p. 326, add, **Nageia Nagi** (Thunb.) Britton & Wilson, grown at the Forest Station, Rio Piedras, was about 1 m. high when two years old in 1928. It is a native of southern Japan, forming a tree about 25 m. high, with ovate to lanceolate leaves, 5-7 cm. long, its globose seeds about 1.5 mm. in diameter. (*Myrica Nagi* Thunb.; *Podocarpus Nagi* Pilger.).

Vol. VI, p. 326, **Nageia coriacea**, add Porto Rican name CAOBA DEL PAIS, ascertained by Hon. Carlos E. Chardon.

Pinus occidentalis, add note: the tree was subsequently transferred to La Granja; as observed in December, 1928, it had reached a height of about 6.5 m. with a trunk diameter of nearly 1.5-dm., but had been badly damaged by the hurricane of September, 1928, and ultimately succumbed. Many seedlings of this pine, from Santo Domingo seed, were seen at the Forest Station, Rio Piedras, in January, 1930, and some had been distributed.

Pinus canariensis, add note, many seedlings were obtained by the Forest Service in March, 1930, from a second instalment of seed. A single plant about 4 dm. high was reported from the St. Croix Experiment Station in April, 1930, raised from seed of 1928.

Under PINACEAE, add note, none of the other species of **Pinus** recorded as experimentally germinated from seed at the Forest Station proved to be persistent.

Pinus nigra Arnold, (*P. austriaca* Hoess.), European, and **Pinus Armandii** Franchet, Chinese, experimentally introduced by the Forest Service, also failed to survive.

Pinus Bungeana Zucc., Chinese, sent to the Forest Service in 1926 by the Bureau of Plant Industry, also failed to respond to the tropical climate.

Vol. VI, p. 327, add ***Pinus insularis*** Endl., BENGUET PINE, of the Philippine Islands, was seen as young trees about 3 dm. high at the Forest Station in 1929, grown from seed of 1927. The two old and stunted trees seen at Villa Leon in 1925 still existed there in December, 1929, but had made scarcely any growth.

Vol. VI, p. 327, add, ***Araucaria imbricata*** Pavon, MONKEY PUZZLE, Chilean, grown for a time by the Forest Service, did not prove to be luxuriant, being better adapted to a warm-temperate climate. It forms large forests in southern Chile; its leaves are stiff, spreading, flat, lanceolate, pungent-pointed, about 5 cm. long.

Vol. VI, p. 327, ***Taxodium distichum***, add record, the tree proved unadapted to the climate of Porto Rico.

Taxodium mucronatum, add record, a tree at the Insular Experiment Station had reached 8 m. in height with a trunk diameter of about 2 dm. in February, 1929.

Vol. VI, p. 328, ***Cupressus lusitanica***, add record, a thrifty young tree, 4 dm. high, was seen at the Mayaguez Experiment Station in 1930, received from the Bureau of Plant Industry in 1929; this, however, was subsequently killed, apparently by root-rot.

Cupressus funebris, add, introduced also at the Forest Station, Rio Piedras, 1925-1926. At the Mayaguez Station this tree had reached height of about 2.5 m. in 1929, as a beautiful, thrifty specimen.

Vol. VI, p. 328, after ***Callitris verrucosa*** add ***Callitris glauca*** R. Br., another Australian species, was also introduced by the Forest Service and recorded as thrifty in 1929. It forms a large tree, recorded as over 30 m. high, but sometimes shrubby, with slender twigs bearing verticillate, scale-like leaves; its globular cones are about 2.5 cm. in diameter.

Add, ***Cedrus Libani*** Barrel., CEDAR OF LEBANON, of Asia Minor, ***Cedrus Deodara*** Loudon, DEODAR CEDAR of India and ***Cedrus atlantica*** Manetti, of northern Africa, appear in the records of the Forest Service, as experimentally introduced through seeds prior to 1928, but failed to establish themselves in the tropical climate. They are very large trees, with very slender, fascicled leaves, and large erect cones.

Vol. VI, p. 328, ***Juniperus bermudiana***, add, recorded as grown also at the Forest Station, Rio Piedras, in 1927.

Vol. VI, p. 329, ***Juniperus procera***, add record, the plant in the Mayaguez collection proved to be persistent, and appeared healthy in 1929, but later succumbed; it was grown also at the Forest Station in 1927.

Vol. VI, p. 329, add ***Juniperus phoenicea*** L., of the Mediterranean region, experimentally grown by the Forest Service in 1927, failed to survive. It was also introduced at the Mayaguez Experiment Station, from the Bureau of Plant Industry in 1928, and a tree 1 m. high was seen there in December, 1929.

Juniperus Cedrus Webb & Berth., native of the Canary Islands, received at the Mayaguez Experiment Station from the Bureau of Plant Industry in February, 1926, was seen there as an apparently healthy small plant, 5 dm. high in 1929. It has narrowly linear, dark green leaves 1.5-2 cm. long; its fruit is described as about 1 cm. in diameter, orange-brown when mature.

At end of PINACEAE, ***Sequoia sempervirens*** (Lambert) Endl., REDWOOD, of Oregon and California, introduced at the Forest Station, Rio Piedras, in 1928, is a very large and highly important tree, with distichous linear leaves 6-20 mm. long, its oblong cones 2.5-4 cm. long. It did not survive in Porto Rico.

Seeds of **Sequoia gigantea**, the GIANT TREE of California, germinated at the Forest Station in 1930.

Phyllocladus trichomanoides D. Don, native of New Zealand, grown at the Forest Station in 1928, and recorded as thrifty, forms a slender tree up to about 20 m. high with verticillate branches, its leaves scale-like, or in young plants linear, becoming united into flat phyllodes 1-2.5 cm. long, various in shape and coriaceous, the flowers borne on the margins of the phyllodes, succeeded by nut-like fruits.

Agathis australis (Lamb.) Steud., KAURI PINE, native of New Zealand, also experimentally grown by the Forest Service in 1927, proved unadapted to the climate of Porto Rico and succumbed. It is one of the most magnificent forest trees known, said to be fast disappearing. (*Dammara australis* Lamb.).

Taiwania cryptomerioides Hayata, a tree native of Formosa was experimentally introduced as seedlings from the Bureau of Plant Industry by the Forest Service in 1924, but failed to live. It is a very interesting evergreen, with leaves of two kinds, those of fruiting branches scale-like and imbricated, those of vegetative branches linear-subulate; its oblong cones are 1-1.5 cm. long.

Vol. VI, p. 330, **Zamia media**, add locality, frequent on the limestone plain, Cape Borinquen, March, 1929.

After **Cycas circinalis** add **Ginkgo biloba** L. MAIDEN-HAIR TREE, of eastern Asia, was experimentally grown by the Forest Service in 1926; it could not withstand the tropical climate. It constitutes the order Ginkgoales. Its leaves are fan-shaped and slender-petioled; its fruit is a malodorous drupe.

Vol. VI, p. 331, **Paspalum dilatatum**, add record, introduced also at the St. Croix Experiment Station.

Vol. VI, p. 332, **Pennisetum clandestinum**, the KIKUYA GRASS, was found unadapted for use at the Rio Piedras Station, and rejected. It was introduced also at the St. Croix Experiment Station.

Vol. VI, p. 333, **Dendrocalamus strictus** and **Arundinaria falcata**, after growth of several years were eliminated from the collections of the Rio Piedras Station, reported as unadaptable there.

Dendrocalamus strictus, add record, introduced at the Mayaguez Experiment Station in April, 1929, grown from seeds sent by the Forest Research Institute at Dehre Dun, British India, to the Bureau of Plant Industry, was luxuriant and 2.5 m. high in December, 1929.

Vol. VI, p. 334, **Sabal texanum**, add note, observed again in March, 1929, in the Mayaguez Experiment Station collection, this palm was scarcely larger than in 1926. Another experiment was made there with seeds sent from the New York Botanical Garden in 1928, which germinated, and seedlings were seen there in December, 1929.

Latania Loddigesii, add note, grown also at the Forest Station, Rio Piedras, in 1928, and recorded as thrifty (*Latania glaucophylla* of gardens).

Thrinax parviflora, recorded as introduced at the St. Croix Experiment Station in 1926, and one plant thrifty there in 1930.

Elais melanococca Gaertn., add record, the plants in the Mayaguez collection developed well and fine specimens with leaves 7 dm. long were seen there in March 1929; young plants were also received at the Trujillo Plant Experiment Station in 1927.

Bentinckia nicobarica, add note, this palm failed to establish itself at the Trujillo Station.

Vol. VI, p. 335, **Guilielma utilis**, add record, this palm had reached height of 5 m. at the Mayaguez Experiment Station in 1929, and was then luxuriant.

Erythea armata, add record, this palm was not established at Rio Piedras.

Attalea gomphococca, add record, this palm grew slowly at Mayaguez and was not vigorous in 1929.

Vol. VI, p. 335, **Philodendron Nechodomi**, in description, for "white spots 2-3 m. long," read "2-3 mm. long"; add note, at the end of 1928, this vine had reached a length of about 4 m.; an occasional leaf, instead of being pinnately divided is entire-margined or only lobed on one side.

Vol. VI, p. 336, **Bilbergia pyramidalis**, add note, grown also in Porto Rico.

Vol. VI, p. 337, **Niobe coerulea**, add record, the plant was not established at the Trujillo Station, not responding to the climate at low elevations.

Dracaena marginata, add record, reported by Mr. Thompson as received at the St. Croix Station from Mr. Fairchild in 1927 and thrifty in 1930.

Vol. VI, p. 338, **Lilium tigrinum**, did not prove to be persistent where planted in Porto Rico.

Nerine sarniensis, add record, this species proved to be unadapted to the climate at low elevations.

Vol. VI, p. 339, **Moraea iridioides**, add record, this plant lasted for a time at Trujillo, but ultimately succumbed.

Vallota purpurea, add record, tropical climate proved to be unadapted to this species; few South African plants have succeeded in Porto Rico; experimentation at high elevations might lead to different results.

Vol. VI, p. 339, **Musa textilis**, add record, the plants at the Mayaguez Station grow luxuriantly; Mr. Dewey reports about 400 in the original plot in February, 1930, and that two subsequent introductions were made in 1911 and 1926.

Vol. VI, p. 341, **Casuarina distyla**, add record, also introduced as seedlings from the Bureau of Plant Industry at the Forest Station, Rio Piedras, 1925-1926.

Casuarina cunninghamiana, add record, reported by Mr. Fairchild as raised by him from seed in 1928 at Louisenhoj, St. Thomas, and many young trees distributed in 1929.

Casuarina quadrivalvis, add record, the seedling plants seen at the Forest Station in 1926 had formed thrifty trees in 1928.

Quercus Junghuhnii, add record, the tree at the Mayaguez Experiment Station was luxuriant, slender, about 7 m. high in 1929.

Vol. VI, p. 342, **Myrica rubra**, add note, this species did not prove to be persistent in Porto Rico.

Pterocarya stenoptera, add record, the tree in the Mayaguez collection had not made much growth up to December, 1929; young trees 4 dm. high, from seed of 1929, were reported from the Forest Station in 1930.

Ficus mysorensis, add record, a tree at the Mayaguez Station was well established and over 6 m. high in 1929.

Ficus macrophylla and **Ficus rubiginosa** were also introduced into St. Croix in 1928.

Ficus padifolia, add note, this large tree in the Mayaguez collection subsequently succumbed.

Ficus Sycomorus, add record, the tree at Villa Leon was much broken by the hurricane of September, 1928, but was still alive in December 1929, making some new branches.

Vol. VI, p. 343, **Artocarpus Lakoocha**, add record, a tree in the Mayaguez collection was luxuriant and about 12 m. high in 1929.

Chlorophora excelsa, add record, healthy, but made rather slow growth, becoming about 4 m. high in 1929, at Rio Piedras.

Brosimum Alicastrum, add record, at Mayaguez this tree continued vigorous, reaching height of 5 m. in 1929, but slender.

Vol. VI, p. 344, **Triplaris Cumingiana**, add record, a tree at the Mayaguez Station was luxuriant and over 5 m. high in 1929; young trees had been distributed.

Rumex Patientia, add note, this species did not succeed in the continuously warm climate at the low elevation of Trujillo.

Rheum Rhaponticum, add note, climatal conditions caused RHUBARB to succumb at the low elevation of Trujillo; it was seen growing luxuriantly, however, in the garden of Mr. W. McKay-Jones, at about 600 m. elevation above Villalba, in March, 1930.

Vol. VI, p. 345, **Artabotrys odoratissima**, the prior name is **A. uncinatus** (Lam.) Merrill (*Anona uncinata* Lam.); add record, grown also at the Forest Service at Rio Piedras, but not established.

Michelia fuscata, add note, grown also at the Plant Propagation Station.

Myristica fragrans, add note, the NUTMEG in the Mayaguez collection remained vigorous; Mr. McClelland reported in 1929 that it bore mostly staminate flowers, but produced an occasional fruit.

Monodora tenuifolia, add note, the tree made slow growth, and was damaged by the hurricane of September, 1928, but appeared thrifty in 1930.

Annona purpurea, add record, trees in the Mayaguez collection grew vigorously and were 10 m. high with trunk diameter of about 2.5 dm. in 1929. This tree was also grown from seed at the St. Croix Station in 1930.

Vol. VI, p. 345, **Polyalthia suberosa**, add record, vigorous, about 3.5 m. high in 1929.

Vol. VI, p. 346, **Persea Schiedeana**, add note, this tree succumbed.

Persea drimophila, add note, this tree subsequently succumbed at both stations.

Vol. VI, p. 347, **Bryophyllum crenatum**, **Kalanchoë somaliensis** and **Crassula multicava** are reported by Mr. Fairchild as in fair or good condition at Louisenhoj, in 1930, all having flowered, but **Sedum mexicanum** succumbed.

Byrnesia Weinbergii, add notes, Mr. Fairchild reports this as the best plant of the CRASSALUCEAE grown by him on St. Thomas, and this agrees with experience in Porto Rico.

Vol. VI, p. 348. **Filipendula Ulmaria** and **F. Filipendula** succumbed at the Trujillo Station, as also **Spiraea Van Houttei**; it is possible that these, and other north temperate zone species, experimentally grown, at low elevations in Porto Rico, might persist at high altitudes.

Vol. VI, p. 349, **Albizzia mollis**, the tree near La Muda was destroyed by the hurricane of September, 1928; several trees of about the same size were seen at the Mayaguez Station in 1929.

Vol. VI, p. 350, **Peirania multijuga**, add, grown also at the Experiment Station, Mayaguez, where a fine tree flowered profusely in October, 1929, forming large, elegant panicles of bright yellow flowers.

Bauhinia purpurea read **Phanera purpurea** (L.) Benth. The **Bauhinia** at the St. Croix Station subsequently flowered and has been determined as **B. racemosa** Lam.

Vol. VI, p. 351, **Hermesias grandiceps**, add record, this tree grew luxuriantly and flowered several times.

1928, but was recovering when seen in March, 1929.

Schotia latifolia, add note, this South African tree subsequently succumbed.

Vol. VI, p. 351, add after **Pahudia rhomboidea**, **Pahudia quanzensis** (Welw.) Prain, received at the Forest Station, Rio Piedras, as seedlings, from the Bureau of Plant Industry in 1926, made very slow growth and was only about 3 dm. high in February 1929. It forms a tree 10 m. high or higher and is a native of tropical Africa (*Azelia quanzensis* Welw.).

Vol. VI, p. 351, **Crotalaria anagyroides**, add note, the cultivation of this species was abandoned at Mayaguez, others proving to be preferable.

Crotalaria Retzii, proved valuable and has been considerably planted.

Vol. VI, p. 352, **Pterocarpus macrocarpus**, add record, trees at the Mayaguez Experiment Station had reached height of 5 m. in 1929.

Pterocarpus indicus, add record, trees at the Forest Station had reached height of 9 m. in 1930.

Erythrina tomentosa, add record, tree was persistent at Mayaguez, reaching height of about 1 m. in March, 1929.

Erythrina fusca, add, a young tree about 5 dm. high was seen in the collection at the Mayaguez Station in 1929.

Vol. VI, p. 353, **Coumarouna odorata**, add record, also introduced from seed at the Trujillo Plant Propagation Station in 1928.

Castanospermum australe, add record, continued vigorous in the Mayaguez collection; it was broken in the hurricane of September, 1928.

Derris scandens, add, introduced at the Trujillo Plant Propagation Station in 1927, had reached length of about 4 m. in March, 1930, when a fruiting vine was observed.

Toluifera pereirae, add, introduced also at the Forest Station, Rio Piedras, in 1927. The tree in the Mayaguez collection was luxuriant and about 8 m. in 1929.

Toluifera Balsamum L., BALSAM OF TOLU, received as seedlings at the Forest Station, Rio Piedras, from the Bureau of Plant Industry in 1927, failed to establish itself. It is a very large and valuable tree, native of northern South America.

Vol. VI, p. 354, **Guaiacum guatemalense**, this tree failed to establish itself at Mayaguez.

Cyamopsis psoralioides, add note, the cultivation of this plant was not continued at the Trujillo Station.

Citrus mitis, add record, received from the United States Department of Agriculture in 1926 and planted at La Granja, Porto Rico.

Vol. VI, p. 355, **Chaetospermum glutinosum**, add record, the tree at Villa Leon, seen in 1925, was vigorous in December 1929. A better name for this species is **Swinglea glutinosa** (Blanco) Merrill.

Belou Marmelos, add, seeds from Ceylon were received at the Forest Station, Rio Piedras, in 1928, where plants 2 m. high were seen in February, 1929. (*Croton Marmelos* L.; *Aegle Marmelos* Correa).

Vol. VI, p. 355, add, **Feronella oblata** Swingle, planted at La Granja, Porto Rico in 1926, also from the United States Department of Agriculture, is a pinnate-leaved tree, similar to *Feronella lucida*, but with fewer leaflets and slightly different flowers and fruit; it is a native of Indo-China.

Vol. VI, p. 356, **Melia Azadirachta**, add record, a tree at the Forest Station had become about 7 m. high in 1930. (*Azadirachta indica* Juss.) The beautiful foliage is very dense; the tree appears to be desirable for roadside shade; seedlings were observed under it.

Lansium domesticum, add record, Mr. McClelland reports the Mayaguez trees as luxuriant and up to 4 or 5 m. high in 1930; introduced also at the St. Croix Station in 1928, and about 1 m. high in 1930.

Carapa guianensis, add record, trees in the Mayaguez collection were reported by Mr. McClelland as about 10 m. high, and vigorous in 1930.

Aleurites trisperma, this large tree was destroyed by the hurricane of September, 1928.

Aleurites montana, add record, the tree in the Mayaguez collection was about 8 m. high and luxuriant in 1930, and flowered in the summer. This species was also introduced at the St. Croix Experiment Station.

Euphorbia Tirucalli, add note, the plant grown by Mr. Fairchild on St. Thomas developed luxuriantly, reaching a height of 1.5 meters in 1927.

Vol. VI, p. 357, **Garcia Mayana**, add record, the type tree in the Mayaguez collection was much broken by the hurricane of September, 1928, but many seedling trees were raised subsequently.

Schinus molle, add record, grown also from seed at the St. Croix Experiment Station in 1929.

Vol. VI, p. 358, **Maesopsis berchemioides**, add record, trees at the Forest Station had reached height of 6 m. in 1929, successfully established.

Euphorbia Longana, add record, trees in the Mayaguez collection were luxuriant and had reached height of 7 m. in 1929.

Euphorbia didyma, add note, seen also as young plants about 2 m. high, at the Trujillo Plant Propagation Station in 1930.

Pometia tomentosa, add note, this tree failed to establish itself at Mayaguez.

Vol. VI, p. 359, **Ampelocissus Martini**, add note, foliage of the plant grown at the Insular Experiment Station under this name has been studied by Dr. E. D. Merrill, and identified by him as **Ampelopsis brevipedunculata** (Maxim.) Koehne; this vine found to be unadaptable to the climate, and succumbed.

Elaeocarpus siamensis, add record, a tree at the Experiment Station, Mayaguez, was nearly 10 m. high, and luxuriant in 1929. Trees were seen also at the Insular Experiment Station, Rio Piedras.

Berria Ammonilla, add record, the tree in the Mayaguez collection was about 6 m. high and luxuriant in 1929. The prior name for this species is **Berria cordifolia** (Willd.) Burret.

Vol. VI, p. 360, **Malvaviscus grandiflorus**. The plant thus recorded was destroyed by the hurricane of September, 1928.

Durio zibethinus, add record, trees at the Mayaguez Station were vigorous and almost 6 m. high in 1929; they had not yet flowered.

Chorisia speciosa, add note, this tree perished in the hurricane of September, 1928.

Chorisia insignis Kunth, South American, was introduced by seed from Ecuador, through the Bureau of Plant Industry in 1917, at the Mayaguez Experiment Station, but not established.

Theobroma bicolor, add record, the tree was healthy and about 2.5 m. high in 1929.

Dombeya calantha, add record, this highly ornamental plant proved well adapted to Porto Rico, and a valuable addition to gardens; it produces many, clustered, slender stems, becoming 4 or 5 m. high and flowers profusely.

Cola vera, add record, the tree in the Mayaguez collection was about 6 m. high and luxuriant in 1929.

Vol. VI, p. 361, **Thea sinensis**, add record, the old bush seen at Villa Leon, near Bayamon, in 1925, was still existent in December, 1929, and in bloom at the time.

Vol. VI, p. 362, **Mesua ferrea**, add record, grown also at the Forest Station, Rio Piedras, under the name CEYLON IRONWOOD, young trees were thrifty in 1927. The fine tree seen at Villa Leon in 1925 withstood the hurricane of September, 1928, and was luxuriant in December, 1929; Mrs. Murphy had grown two young trees from seed at this time.

Rheedia lateriflora, add record, the fine tree at Villa Leon was still luxuriant in 1929.

Vol. VI, p. 363, **Oncoba echinata**, add record, shrubs at the Mayaguez Experiment Station were densely luxuriant, about 3 m. high in 1930.

Vol. VI, p. 363, **Doryalis hebecarpa** (Gardn.) Warb., add this shrub was luxuriant, and about 5 m. high at the Mayaguez Station in 1929, seen both in flower and in fruit in December; it has thin, ovate, acuminate leaves about 7 cm. long, small, yellow axillary flowers, the subglobose berries with a watery, intensely acid pulp; it was also established and luxuriant at the Trujillo Plant Propagation Station in 1930. (*Roumea hebecarpa* Gardn.)

Vol. VI, p. 364, **Terminalia myriocarpa**, add record, this tree developed luxuriantly at the Mayaguez Station, being about 15 m. high with trunk diameter of 2 dm. in March, 1929.

Vol. VI, p. 364, add note, **Werckleocereus Tonduzii** and **Deamia Testudo** failed to survive at Monteflores.

Terminalia Arjuna, add record, the large tree seen at Villa Leon in 1925, was broken by the hurricane of September, 1928, but was still luxuriant and heavily fruiting in December, 1929. Seedlings were reported from the St. Croix Experiment Station in April, 1930. RAW BEEF TREE.

Melastoma Molkenboeri, and **Tibouchina semidecandra**, add note, these ornamental shrubs grew luxuriantly at the Trujillo Station, but were destroyed by the hurricane of September, 1928.

Vol. VI, p. 364, last paragraph, add note, dried, apparently immature fruits of the large tree in coastal woods at La Sardinera, borne on a branch broken off in the hurricane of September, 1928, were detected by Chief Forester Kramer on February 6, 1929; these are globose, about 5 mm. in diameter, glabrous, the concave, spreading, persistent calyx with 4 short, rounded lobes; the old inflorescence is forked, the rather stout pedicels about 1 cm. long or longer. Seedlings were found under the tree and transplanted to the Forest Station. No other tree of its kind was seen by us, or reported to us; in Porto Rico; we have tentatively referred it to **Ananomis fragrans**.

Vol. VI, p. 365, **Myrciaria cauliflora**, add note, this tree succumbed at Rio Piedras.

Caryophyllus aromaticus, add note, the CLOVE did not develop at the Trujillo Station and ultimately succumbed.

Melaleuca linearifolia Smith, seen as young trees at the Trujillo Plant Propagation Station in January 1930, differs from **M. Leocodendron** by its narrowly linear leaves about 3 cm. long.

Barringtonia asiatica, add record, the tree remained vigorous at Mayaguez, but small in 1929.

Grias cauliflora, add record, two luxuriant young trees 1.5 m. high were seen at the Trujillo Plant Propagation Station in March, 1930.

Lecythis Zabucajo, add, introduced also at the Forest Station, Rio Piedras, from the Bureau of Plant Industry, in 1927. A tree at the Trujillo Plant Propagation Station had reached a height of 4 m. in March, 1929.

Didymopanax Gleasonii, add to description, fruit 6.5–7.5 mm. broad, 5–6 mm. long.

Vol. VI, p. 366, **Hipposelinum Levisticum**, add note, the cultivation of LOVAGE was not continued at the Trujillo Station.

Clavija longifolia, add note, the tree, while established, made very slow growth, being only about 3 dm. high in February, 1929.

Vol. VI, p. 367, **Mimusops marginata** add record, this tree continued weak at the Mayaguez Station, but was still existent in 1930.

Diospyros Kaki, add record, this tree made scarcely any growth at the Trujillo Station up to 1929, but was reported as well established in March, 1930.

Gelsemium sempervirens, add note, this vine proved to be unadaptable to the climate and succumbed.

Buddleia Colvillei add note, this tree from Sikkim failed to develop in the climate of Porto Rico.

Imbricaria coriacea, add note, this fine tree in the Mayaguez collection was destroyed by the hurricane of September, 1928.

Vol. VI, p. 368, specimens of the tree referred to as a species of **Funtumia**, were sent to Mr. N. E. Brown at the Royal Botanic Gardens, Kew, England, and there studied by him, in comparison with its relatives; this investigation showed that they constitute a distinct genus, **Lanugia** N. E. Brown, the tree at the Mayaguez Station becoming **Lanugia latifolia** N. E. Brown; the genus and species were described by Mr. Brown in *Torreyia* 27: 51–53. 1927.

Vol. VI, p. 369, **Vitex parviflora**, add, young trees were transferred to the Maricao Forest in 1926; Chief Forester Kramer reports that they had made little growth up to February, 1929.

Cordia Blancoi, add record, this tree continued luxuriant in the Mayaguez collection where it was observed again in 1929.

Vol. VI, p. 370, **Gmelina arborea**, add note, this tree perished during the hurricane of September, 1928.

Salvia officinalis, add note, Mr. Adolf Mayoral reports that GARDEN SAGE continued at the Trujillo Station for about three years, but then succumbed.

Vol. VI, p. 371, **Psychotria luconiensis**, add record, the tree was nearly destroyed by the hurricane in September, 1928; it had made a few new shoots in March, 1929.

Vol. VI, p. 494, add at end of POLYPODIACEAE, **Cyrtomium Fortunei** J. Smith, Japanese, grown at Louisenhöj, St. Thomas in November 1929, has fronds 3-4 dm. long, the pinnae 7-10 cm. long and 2.5 cm. or less broad, the base sometimes truncate.

Vol. VI, p. 519, **Selaginella stolonifera**, add to distribution, St. Thomas (A. Nelthropp, no. 9, December, 1929.)

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Prepared with much aid from Elizabeth G. Britton

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